Fastener Tightening Specifications

Application	Specification	
	Metric	English
Brake Pressure Modulator Valve/Electronic Brake Control Module (BPMV/EBCM) Assembly Bracket Mounting Bolts.	12 Nm	8 lb in
BPMV Brake Pipes.	15 Nm	11 lb ft
BPMV/EBCM Assembly to Bracket Mounting Nuts.	8 Nm	70 lb in
EBCM to BPMV Mounting Screws.	First pass 2 Nm Second Pass 3 Nm	First pass 17 lb in Second Pass 26 lb in
Rear Wheel Speed Sensor To Knuckle Retaining Bolt	7 Nm	62 lb in
Yaw Rate Sensor/Lateral Acceleration Sensor Nuts.	9 Nm	79 lb in

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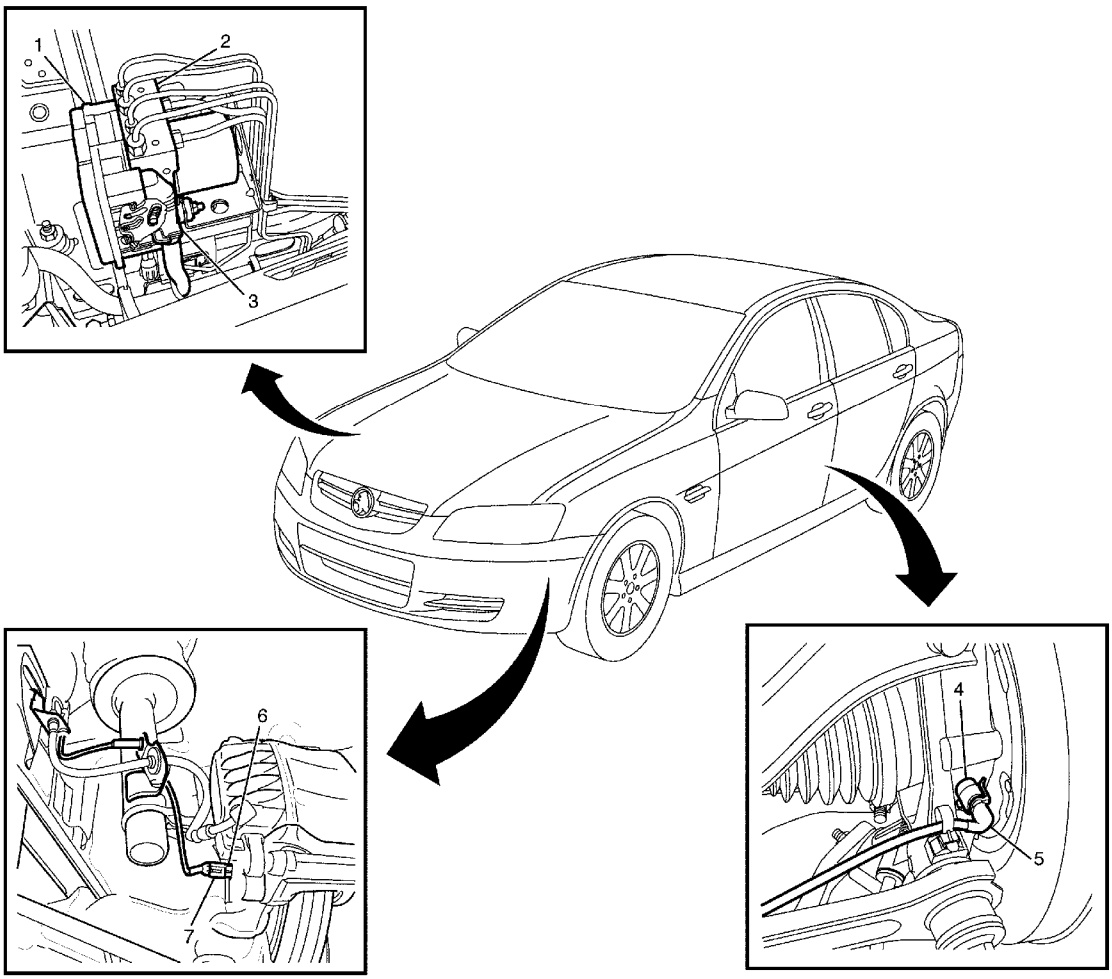
EBCM/BPMV Assembly and Wheel Speed Sensors



(1) Electronic Brake Control Module (EBCM)
(2) Brake Pressure Modulator Valve (BPMV)
(3) EBCM Connector
(4) Wheel Speed Sensor - LR (RR Same)
(5) Wheel Speed Sensor Connector - LR (RR Same)
(6) Wheel Speed Sensor (WSS) - LF (RF Same)
(7) Wheel Speed Sensor Connector - LF (RF Same)

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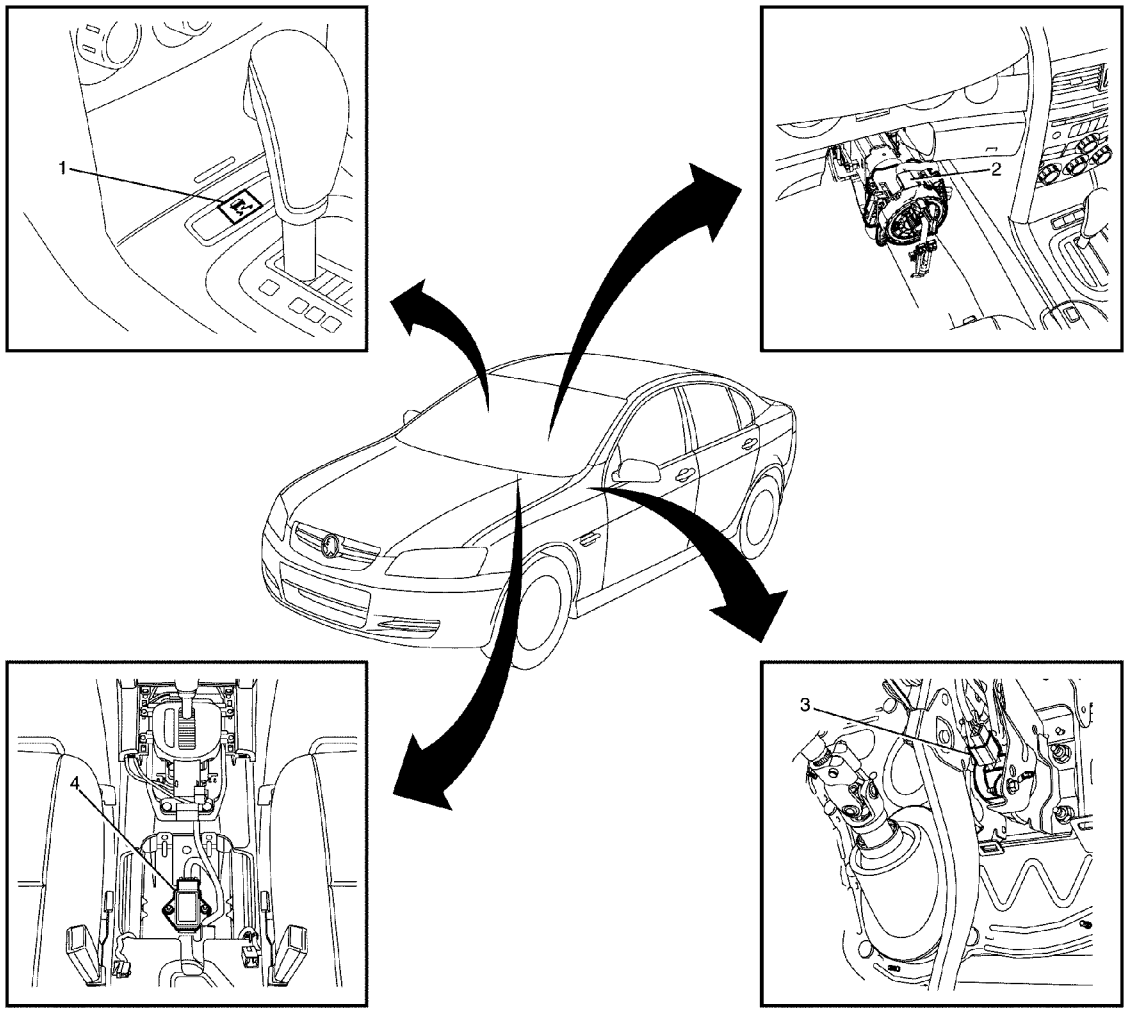
Steering Angle Sensor, Brake Pedal Position Sensor, ESP Switch and Yaw Rate/Lateral Accelerometer Sensor



(1) SRS Coil Assembly (Incorporates the Steering Angle Sensor, SRS Coil and Indicator Cancel Cam Assembly)
(2) ESP Switch
(3) Yaw Rate/Lateral Accelerometer Sensor
(4) Brake Pedal Position Sensor

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Fastener Tightening Specifications

Application	Specification	
	Metric	English
Brake Caliper Bleeder Valve Dry Torque	12 Nm	106 lb in
Brake Hose to Caliper Banjo Bolt Dry Torque	35 Nm	26 lb ft
Front Brake Caliper Anchor Plate to Knuckle Retaining Bolt		
- First Pass	60 Nm	44 lb ft
- Final Pass	120 Degrees	
Front Brake Caliper Pin Retaining Bolt	42 Nm	31 lb ft
Front Brake Disc Splash Shield to Steering Knuckle Retaining Bolt	9 Nm	71 lb in
Rear Disc Brake Backing Plate to Knuckle Retaining Bolt - Upper	60 Nm	44 lb ft
Rear Disc Brake Backing Plate to Knuckle Retaining Bolts - Lower	130 Nm	96 lb ft
Rear Brake Caliper to Knuckle Retaining Bolt	110 Nm	81 lb ft
Rear Brake Caliper Pin Retaining Bolt	42 Nm	31 lb ft

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Disc Brake Component Specifications

Application	Specification	
	Metric	English
Front Brake Rotors (Base)		
Rotor Diameter	298 mm	11.732 in
Rotor Discard Thickness	28 mm	1.102 in
Rotor Maximum Allowable Assembled Lateral Runout	0.05 mm	0.002 in
Rotor Maximum Allowable Scoring	1.5 mm	0.059 in
Rotor Maximum Allowable Thickness Variation	0.02 mm	0.001 in
Rotor Minimum Thickness after Refinishing	28.75 mm	1.132 in
Rotor Thickness New	30 mm	1.181 in
Front Brake Rotors (GT)		
Rotor Diameter	321 mm	12.638 in
Rotor Discard Thickness	28 mm	1.102 in
Rotor Maximum Allowable Assembled Lateral Runout	0.05 mm	0.002 in
Rotor Maximum Allowable Scoring	1.5 mm	0.059 in
Rotor Maximum Allowable Thickness Variation	0.02 mm	0.001 in
Rotor Minimum Thickness after Refinishing	28.75 mm	1.131 in
Rotor Thickness New	30 mm	1.181 in
Rear Brake Rotors (Base)		
Rotor Diameter	302 mm	11.890 in
Rotor Discard Thickness	20 mm	0.787 in
Rotor Maximum Allowable Assembled Lateral Runout	0.05 mm	0.002 in
Rotor Maximum Allowable Scoring	1.5 mm	0.059 in
Rotor Maximum Allowable Thickness Variation	0.02 mm	0.001 in
Rotor Minimum Thickness after Refinishing	20.75 mm	0.817 in
Rotor Thickness New	22 mm	0.866 in
Rear Brake Rotors (GT)		
Rotor Diameter	324 mm	12.751 in
Rotor Discard Thickness	20 mm	0.787 in
Rotor Maximum Allowable Assembled Lateral Runout	0.05 mm	0.002 in
Rotor Maximum Allowable Scoring	1.5 mm	0.059 in
Rotor Maximum Allowable Thickness Variation	0.02 mm	0.001 in
Rotor Minimum Thickness after Refinishing	20.75 mm	0.817 in
Rotor Thickness New	22 mm	0.866 in

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Front Disc Brake Pads Replacement

Removal Procedure

Tools Required

J 23738-A Hand Vacuum Pump.

Caution: Refer to Safety Glasses Caution in the Preface section.

Caution: Refer to Vehicle Lifting Caution in the Preface section.

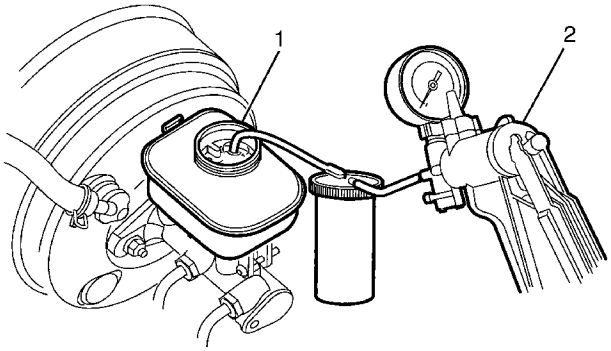
Caution: Refer to Brake Dust Caution in the Preface section.

Caution: Refer to Brake Fluid Caution in the Preface section.

Caution: Refer to Brake Fluid Irritant Caution in the Preface section.

Notice: Refer to Adding Fluid to the Brake System Notice in the Preface section.

Notice: Refer to Brake Fluid Effects on Paint and Electrical Components Notice in the Preface section.



1. Inspect the fluid level in the master cylinder reservoir (1).
   - If the brake fluid level is midway between the maximum fill level and the minimum allowable level, no brake fluid needs to be removed from the master cylinder reservoir (1) before proceeding.

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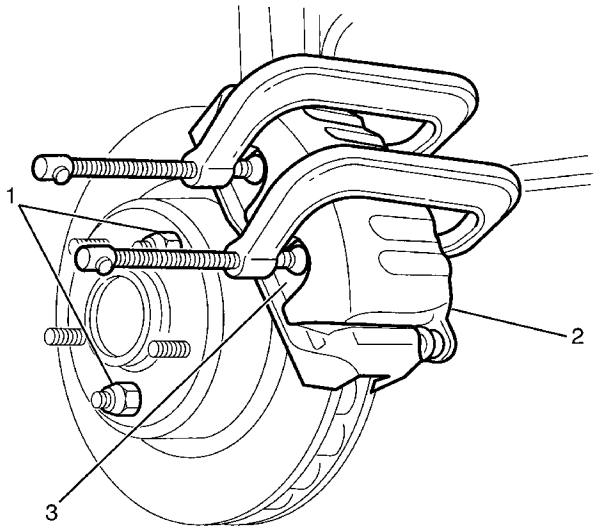
Important: DO NOT completely empty the master cylinder reservoir (1) or remove any brake lines otherwise complete bleeding of the braking system will be necessary.

Important: DO NOT re use the removed fluid.

- If the brake fluid level is higher than midway between the maximum fill level and the minimum allowable level, using a hand vacuum pump (2) syphon the brake fluid to the midway point before proceeding.

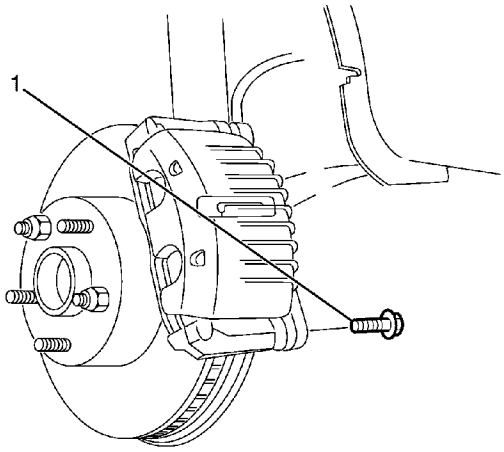
2. Raise and support the vehicle. Refer to Lifting and Jacking the Vehicle .
3. Remove the front wheels. Refer to Tire and Wheel Removal and Installation .



4. Install two wheel nuts (1) in reverse to opposite wheel studs to retain the brake disc to the hub.

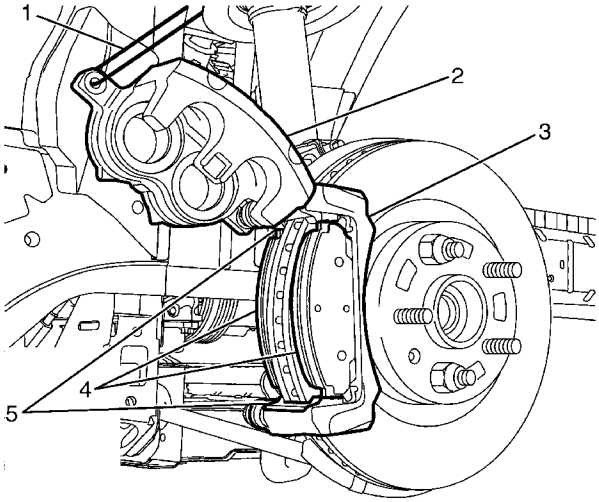
Important: Position the ends of the G-clamps against the rear of the brake caliper (2) and against the outboard brake pad (3).

5. Install large G-clamps over the body of the brake caliper (2).
6. Tighten the G-clamps evenly until the brake caliper pistons bottom out in each brake caliper bore.
7. Remove the G-clamps from the brake caliper (2).



Important: Bolts with micro-encapsulated thread sealant must be discarded after removal.

8. Remove the brake caliper lower guide pin bolt (1). Discard the bolt (1).



Notice: Support the brake caliper with heavy mechanic wire, or equivalent, whenever it is separated from its mount and the hydraulic flexible brake hose is still connected. Failure to support the caliper in this manner will cause the flexible brake hose to bear the weight of the caliper, which may cause damage to the brake hose and in turn may cause a brake fluid leak.

Important: DO NOT disconnect the brake hose from the brake caliper (2).

9. Pivot the brake caliper (2) upward and secure with heavy mechanics wire (1), or equivalent.

10. Remove the brake pads (4) from the brake caliper anchor plate (3).
11. Remove the brake pad retainers (5) from the brake caliper anchor plate (3).
12. Clean the brake pad brake pad retainer surfaces of the brake caliper anchor plate (3).

Important: Inspect the brake caliper guide pins for freedom of movement and the condition of the guide pin boots. This is achieved by moving the guide pins inboard and outboard within the brake caliper anchor plate (3) bores, without disengaging the slides from the boots.

13. Inspect the brake caliper guide pins and boots for the following conditions:
    - Restricted brake caliper guide pin movement.
    - Too much brake caliper guide pin play in the brake caliper anchor plate (3).
    - Seized or binding brake caliper guide pins.
    - Split or torn boots.
14. If any of the conditions listed are found, overhaul or replace the brake caliper (2).

Installation Procedure

Caution: Refer to Safety Glasses Caution in the Preface section.

Caution: Refer to Vehicle Lifting Caution in the Preface section.

Caution: Refer to Brake Dust Caution in the Preface section.

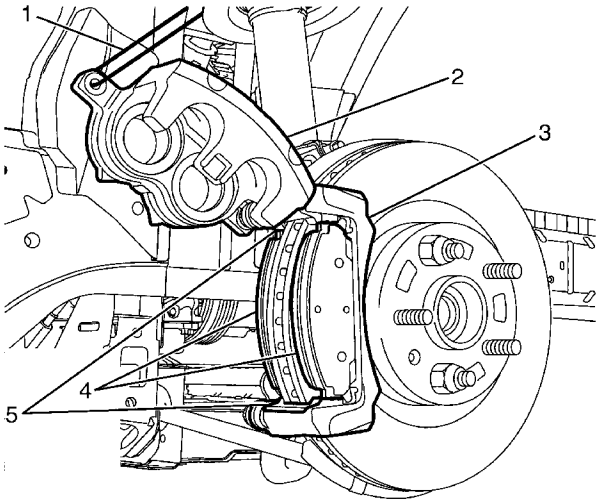
Caution: Refer to Brake Fluid Caution in the Preface section.

Caution: Refer to Brake Fluid Irritant Caution in the Preface section.

Notice: Refer to Adding Fluid to the Brake System Notice in the Preface section.

Notice: Refer to Brake Fluid Effects on Paint and Electrical Components Notice in the Preface section.

1. Clean the piston to brake pad contact faces as required.



2. Install the brake pad retainers (5) to the brake caliper anchor plate (3).

   Important: The brake pads (4) are marked as inner and outer only. Failure to install the brake pads (4) in their correct position will cause the brake pads (4) not to seat correctly in the brake caliper (2).

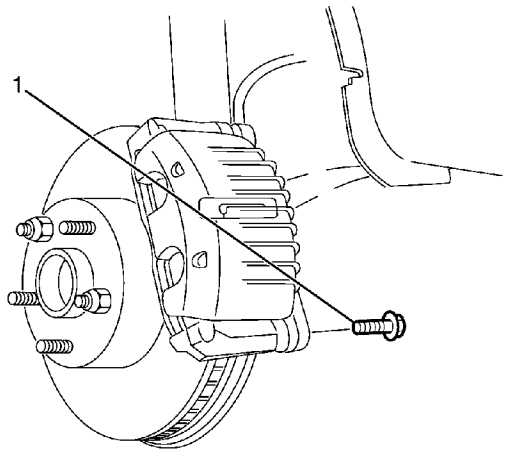
3. Install the brake pads (4) to the brake caliper anchor plate (3).

   Notice: Make sure the brake hose is not twisted or kinked after installation. Damage to the hose could result.

4. Remove the mechanics wire (1) or equivalent, and rotate the brake caliper (2) into position over the brake pads (4) and to the brake caliper anchor plate (3).

   Make sure the brake hose is correctly located in its mounting bracket.

   Notice: Refer to Fastener Notice in the Preface section.



5. Install the NEW lower brake caliper guide pin bolt (1).

   Tighten
   Tighten the bolt to 42 Nm (31 lb ft).

6. Remove the two wheel nuts retaining the brake disc to the hub.
7. Install the front wheels. Refer to Tire and Wheel Removal and Installation .
8. Lower the vehicle to the ground.
9. With the engine off, gradually apply the brake pedal approximately 2/3 of its travel distance.
10. Slowly release the brake pedal.
11. Repeat steps 9 and 10 until a firm brake pedal is obtained. This will correctly seat the brake

caliper pistons and brake pads.

12. Fill the master cylinder reservoir to the correct level. Refer to Master Cylinder Reservoir Filling .
13. Burnish (bed in) the brake pads and brake discs. Refer to Brake Pad and Rotor Burnishing .

Rear Disc Brake Pads Replacement

Removal Procedure

Tools Required

J 23738-A Hand Vacuum Pump.

Caution: Refer to Safety Glasses Caution in the Preface section.

Caution: Refer to Vehicle Lifting Caution in the Preface section.

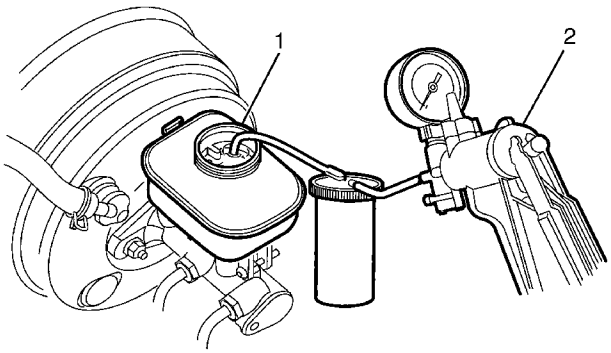
Caution: Refer to Brake Dust Caution in the Preface section.

Caution: Refer to Brake Fluid Caution in the Preface section.

Caution: Refer to Brake Fluid Irritant Caution in the Preface section.

Notice: Refer to Adding Fluid to the Brake System Notice in the Preface section.

Notice: Refer to Brake Fluid Effects on Paint and Electrical Components Notice in the Preface section.



1. Inspect the fluid level in the master cylinder reservoir (1).
   - If the brake fluid level is midway between the maximum fill level and the minimum allowable level, no brake fluid needs to be removed from the master cylinder reservoir (1) before proceeding.

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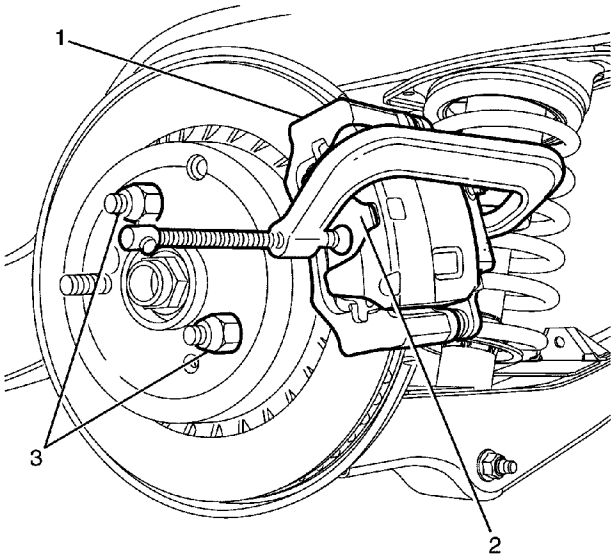
Important: DO NOT completely empty the master cylinder reservoir (1) or remove any brake lines otherwise complete bleeding of the braking system will be necessary.

Important: DO NOT re use the removed fluid.

- If the brake fluid level is higher than midway between the maximum fill level and the minimum allowable level, syphon the brake fluid to the midway point using a hand vacuum pump (2) before proceeding.

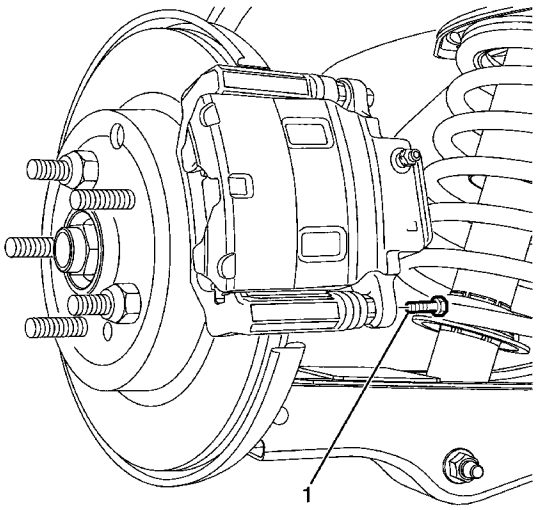
2. Raise and support the vehicle. Refer to Lifting and Jacking the Vehicle .
3. Remove rear wheels. Refer to Tire and Wheel Removal and Installation .



4. Install two wheel nuts (3) in reverse to opposite wheel studs to retain the brake disc to the hub.

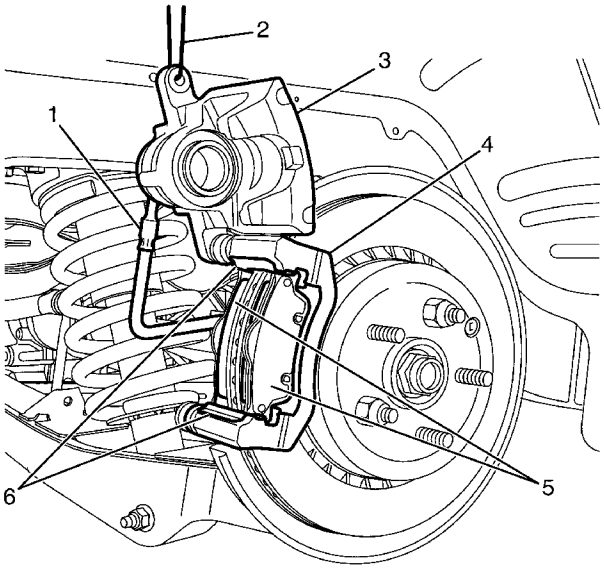
Important: Position the ends of the G-clamp against the rear of the brake caliper (1) and against the outboard brake pad (2).

5. Install a large G-clamp over the body of the brake caliper (1).
6. Tighten the G-clamp until the brake caliper piston bottoms out in the brake caliper bore.
7. Remove the G-clamp from the brake caliper (1).



Important: Bolts with micro-encapsulated thread sealant must be discarded after removal.

8. Remove the brake caliper lower guide pin bolt (1) and discard.



Notice: Support the brake caliper with heavy mechanic wire, or equivalent, whenever it is separated from its mount and the hydraulic flexible brake hose is still connected. Failure to support the caliper in this manner will cause the flexible brake hose to bear the weight of the caliper, which may cause damage to the brake hose and in turn may cause a brake fluid leak.

Important: DO NOT disconnect the brake hose (1) from the brake caliper (3).

9. Pivot the brake caliper (3) upward and secure with heavy mechanics wire (2), or equivalent.

10. Remove the brake pads (5) from the brake caliper anchor plate (4).
11. Remove the brake pad retainers (6) from the brake caliper anchor plate (4).
12. Clean the brake pad retainer mating surfaces of the brake caliper anchor plate (4).

Important: Inspect the brake caliper guide pins for freedom of movement and the condition of the guide pin boots. This is achieved by moving the guide pins inboard and outboard within the brake caliper anchor plate (4) bores, without disengaging the slides from the boots.

13. Inspect the brake caliper guide pins and boots for the following conditions:
    - Restricted brake caliper guide pin movement.
    - Too much brake caliper guide pin play in the brake caliper anchor plate (4).
    - Seized or binding brake caliper guide pins.
    - Split or torn boots.
14. If any of the conditions listed are found, overhaul or replace the brake caliper (3).

Installation Procedure

Caution: Refer to Safety Glasses Caution in the Preface section.

Caution: Refer to Vehicle Lifting Caution in the Preface section.

Caution: Refer to Brake Dust Caution in the Preface section.

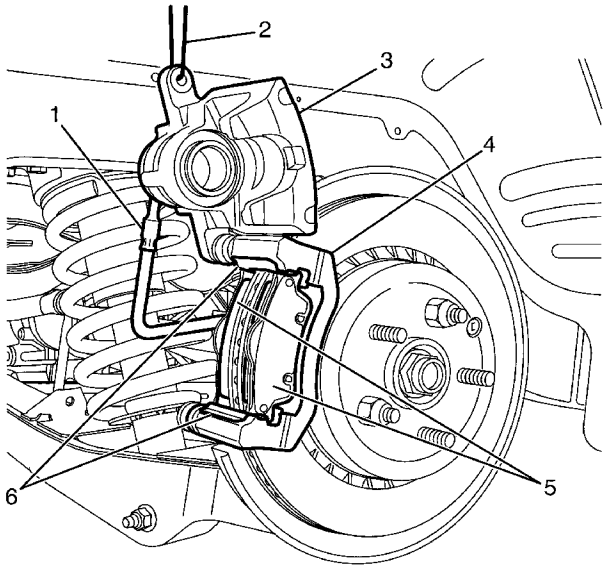
Caution: Refer to Brake Fluid Caution in the Preface section.

Caution: Refer to Brake Fluid Irritant Caution in the Preface section.

Notice: Refer to Adding Fluid to the Brake System Notice in the Preface section.

Notice: Refer to Brake Fluid Effects on Paint and Electrical Components Notice in the Preface section.

1. Thoroughly clean both piston to brake pad contact faces as required.



2. Install the brake pad retainers (6) to the brake caliper anchor plate (4).

   Important: The brake pads (5) are marked as left hand inner and right hand inner and must only be fitted to their respective positions to optimise brake pad life and performance.

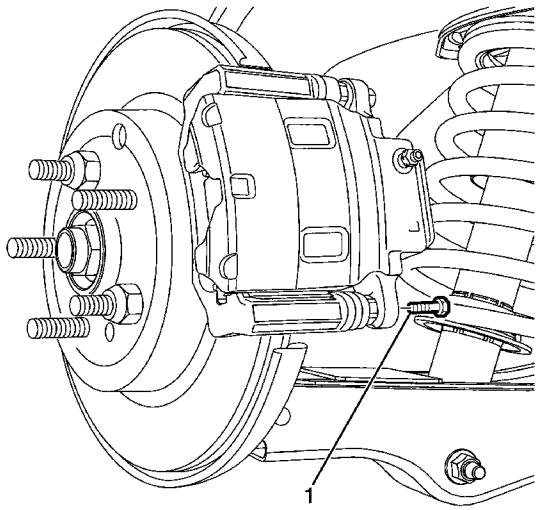
3. Install the brake pads (5) to the brake caliper anchor plate (4).

   Notice: Make sure the brake hose is not twisted or kinked after installation. Damage to the hose could result.

4. Remove the mechanics wire (2) or equivalent , and rotate the brake caliper (3) into position over the brake pads (5) and to the brake caliper anchor plate (4).

   Make sure the brake hose (1) is correctly located in its mounting bracket.

   Notice: Refer to Fastener Notice in the Preface section.



5. Install the NEW lower brake caliper guide pin bolt (1).

   Tighten
   Tighten the bolt to 42 Nm (31 lb ft).

6. Remove the two wheel nuts retaining the brake disc to the hub.
7. Install the rear wheels. Refer to Tire and Wheel Removal and Installation .
8. Lower the vehicle to the ground.
9. With the engine off, gradually apply the brake pedal approximately 2/3 of its travel distance.
10. Slowly release the brake pedal.
11. Repeat steps 9 and 10 until a firm brake pedal is obtained. This will correctly seat the brake caliper pistons and brake pads.

12. Fill the master cylinder reservoir to the correct level. Refer to Master Cylinder Reservoir Filling .
13. Burnish (bed in) the brake pads and brake discs. Refer to Brake Pad and Rotor Burnishing .

Front Brake Caliper Replacement

Removal Procedure

Tools Required

J 23738-A Hand Vacuum Pump.

Caution: Refer to Safety Glasses Caution in the Preface section.

Caution: Refer to Vehicle Lifting Caution in the Preface section.

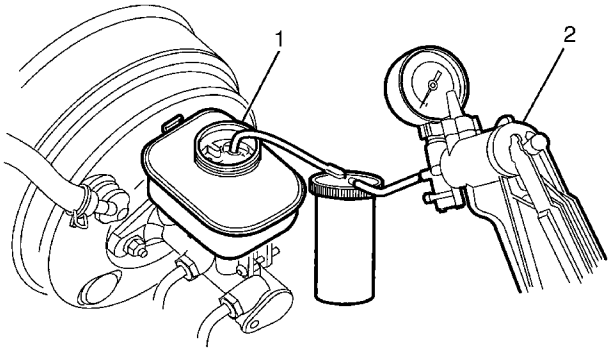
Caution: Refer to Brake Dust Caution in the Preface section.

Caution: Refer to Brake Fluid Caution in the Preface section.

Caution: Refer to Brake Fluid Irritant Caution in the Preface section.

Notice: Refer to Adding Fluid to the Brake System Notice in the Preface section.

Notice: Refer to Brake Fluid Effects on Paint and Electrical Components Notice in the Preface section.



1. Inspect the fluid level in the master cylinder reservoir (1).
   - If the brake fluid level is midway between the maximum fill level and the minimum allowable level, no brake fluid needs to be removed from the master cylinder reservoir (1) before proceeding.

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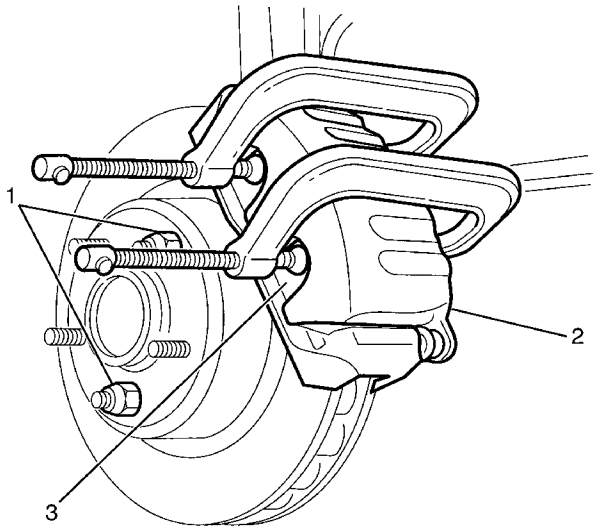
Important: DO NOT completely empty the master cylinder reservoir (1) or remove any brake lines otherwise complete bleeding of the braking system will be necessary.

Important: DO NOT re use the removed fluid.

- If the brake fluid level is higher than midway between the maximum fill level and the minimum allowable level, using a hand vacuum pump (2) syphon the brake fluid to the midway point before proceeding.

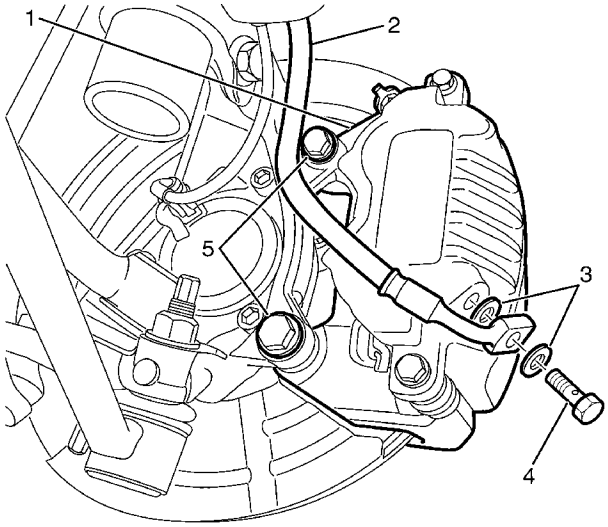
2. Raise and support the vehicle. Refer to Lifting and Jacking the Vehicle .
3. Remove the front wheels. Refer to Tire and Wheel Removal and Installation .



4. Install two wheel nuts (1) in reverse to opposite wheel studs to retain the brake disc to the hub.

Important: Position the ends of the G-clamps against the rear of the brake caliper (2) and against the outboard brake pad (3).

5. Install large G-clamps over the body of the brake caliper. (2)
6. Tighten the G-clamps evenly until the brake caliper pistons bottom in each brake caliper bore.
7. Remove the G-clamps from the brake caliper (2).
8. Place a clean suitable container under the brake caliper assembly.



9. Remove the brake hose to brake caliper banjo retaining bolt (4).

Important: Install a rubber cap or plug on the exposed brake hose end in order to prevent fluid loss and contamination.

10. Separate the brake hose to brake caliper banjo retaining bolt (4) from the brake hose (2).

Important: Copper brake hose sealing washers become work hardened due to the heat generated with brake applications and will not reseal. Install NEW copper brake hose sealing washers (3) whenever the brake hose to brake caliper banjo retaining bolt (4) is removed.

11. Remove and discard the two copper brake hose sealing washers (3). The copper brake hose sealing washers (4) may be stuck to the brake caliper (1) and/or the brake hose (2).

Important: Bolts with micro-encapsulated thread sealant must be discarded after removal.

12. Remove the brake caliper anchor plate to knuckle retaining bolts (5) and discard.
13. Remove the brake caliper assembly (1) from the front hub assembly.

Installation Procedure

Caution: Refer to Safety Glasses Caution in the Preface section.

Caution: Refer to Vehicle Lifting Caution in the Preface section.

Caution: Refer to Brake Dust Caution in the Preface section.

Caution: Refer to Brake Fluid Caution in the Preface section.

Caution: Refer to Brake Fluid Irritant Caution in the Preface section.

Notice: Refer to Adding Fluid to the Brake System Notice in the Preface section.

Notice: Refer to Brake Fluid Effects on Paint and Electrical Components Notice in the Preface section.

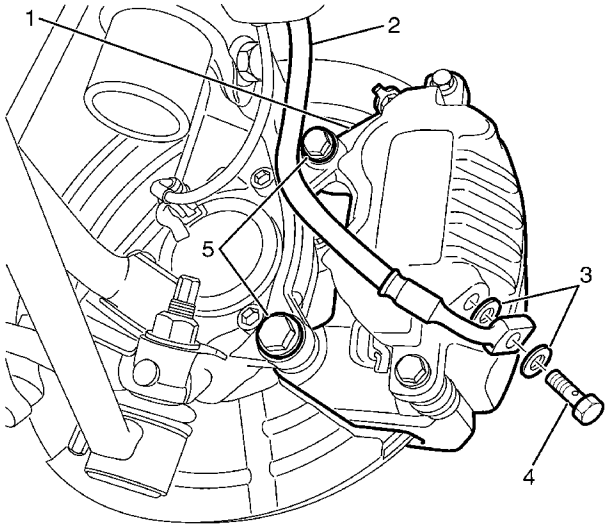
Notice: Make sure the brake hose is not twisted or kinked after installation. Damage to the hose could result.

1. Clean the front brake caliper anchor plate mounting surfaces to the front steering kunckle.
2. Check the serviceability of the brake pads. Refer to Brake Pad Inspection .

Important: The brake pads are marked as inner and outer only. Failure to install the brake pads in their correct position will cause the brake pads not to seat correctly in the brake caliper.

3. Install the existing or NEW brake pads as required.
4. Press the inner brake pad by using a suitable tool to make sure the brake caliper pistons bottom in each brake caliper bore.
5. Position the front brake caliper assembly over the front brake disc.

Notice: Refer to Fastener Notice in the Preface section.



6. Install the NEW front brake caliper anchor plate to front steering knuckle retaining bolts (5).

Tighten
Tighten the bolts to 60 Nm +120° (44 lb ft +120°).

Notice: Make sure the brake hose is not twisted or kinked after installation. Damage to the hose could result.

Important: Install NEW copper brake hose sealing washers (3).

7. Install the front brake hose (2) to brake caliper banjo retaining bolt (4) and NEW copper brake hose sealing washers (3) to the front brake caliper (1).

Tighten
Tighten the banjo bolt to 35 Nm (25 lb ft).

8. Bleed the braking system. Refer to Hydraulic Brake System Bleeding .
9. Remove the two wheel nuts retaining the brake disc to the hub.
10. Install the front wheels. Refer to Tire and Wheel Removal and Installation .
11. Lower the vehicle to the ground.
12. With the engine OFF, gradually apply the brake pedal to approximately 2/3 of its travel distance.
13. Slowly release the brake pedal.
14. Repeat steps 12 and 13 until a firm brake pedal is obtained. This will correctly seat the brake caliper pistons and brake pads.
15. Fill the master cylinder reservoir to the correct level. Refer to Master Cylinder Reservoir Filling .
16. Burnish (bed in) the brake pads and brake discs if required. Refer to Brake Pad and Rotor Burnishing .

Rear Brake Caliper Replacement

Removal Procedure

Tools Required

J 23738-A Hand Vacuum Pump.

Caution: Refer to Safety Glasses Caution in the Preface section.

Caution: Refer to Vehicle Lifting Caution in the Preface section.

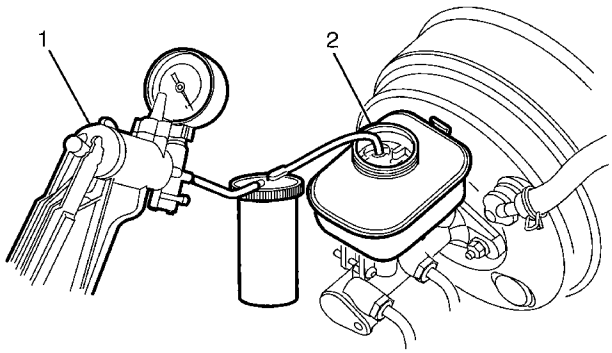
Caution: Refer to Brake Dust Caution in the Preface section.

Caution: Refer to Brake Fluid Caution in the Preface section.

Caution: Refer to Brake Fluid Irritant Caution in the Preface section.

Notice: Refer to Adding Fluid to the Brake System Notice in the Preface section.

Notice: Refer to Brake Fluid Effects on Paint and Electrical Components Notice in the Preface section.



1. Inspect the fluid level in the brake master cylinder reservoir (1).
   - If the brake fluid level is midway between the maximum [dash] fill level and the minimum allowable level, no brake fluid needs to be removed from the master cylinder reservoir (2) before proceeding.

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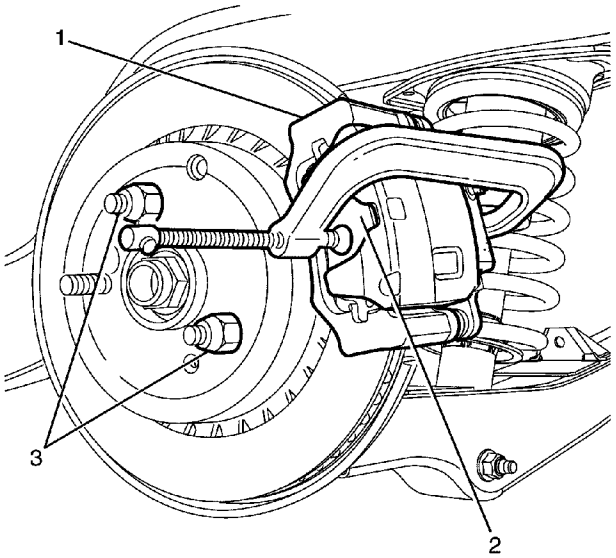
Important: DO NOT completely empty the master cylinder reservoir (2) or remove any brake lines otherwise complete bleeding of the braking system will be necessary.

Important: DO NOT re use the removed fluid.

- If the brake fluid level is higher than midway between the maximum [dash] fill level and the minimum allowable level, syphon the brake fluid to the midway point using a hand vacuum pump (1) before proceeding.

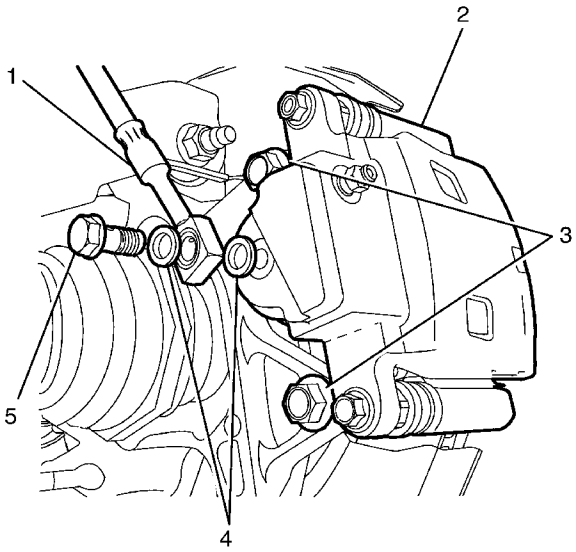
2. Raise and support the vehicle. Refer to Lifting and Jacking the Vehicle .
3. Remove the rear wheels. Refer to Tire and Wheel Removal and Installation .



4. Install two wheel nuts (3) in reverse to opposite wheel studs to retain the brake disc to the hub.

Important: Position the ends of the G-clamp against the rear of the brake caliper (1) and against the outboard brake pad (2).

5. Install a large G-clamp over the body of the brake caliper (1).
6. Tighten the G-clamp until the brake caliper piston bottoms out in the brake caliper bore.
7. Remove the G-clamps from the brake caliper (1).
8. Place a drain tray beneath the brake caliper assembly.



9. Remove the brake hose to brake caliper banjo retaining bolt (5).

   Important: Install a rubber cap or plug on the exposed brake hose end in order to prevent fluid loss and contamination.

10. Separate the brake hose to brake caliper banjo retaining bolt (5) from the brake hose (1).

    Important: Copper brake hose sealing washers become work hardened due to the heat generated with brake applications and will not reseal. Install NEW copper brake hose sealing washers (4) whenever the brake hose to brake caliper banjo retaining bolt (5) is removed.

11. Remove and discard the two copper brake hose sealing washers (4). The copper brake hose sealing washers (4) may be stuck to the brake caliper (2) and/or the brake hose (1).

    Important: Bolts with micro-encapsulated thread sealant must be discarded after removal.

12. Remove and discard the front brake caliper anchor plate to front steering knuckle retaining bolts (3).
13. Remove the front brake caliper assembly (2) from the vehicle.

Installation Procedure

Caution: Refer to Safety Glasses Caution in the Preface section.

Caution: Refer to Vehicle Lifting Caution in the Preface section.

Caution: Refer to Brake Dust Caution in the Preface section.

Caution: Refer to Brake Fluid Caution in the Preface section.

Caution: Refer to Brake Fluid Irritant Caution in the Preface section.

Notice: Refer to Adding Fluid to the Brake System Notice in the Preface section.

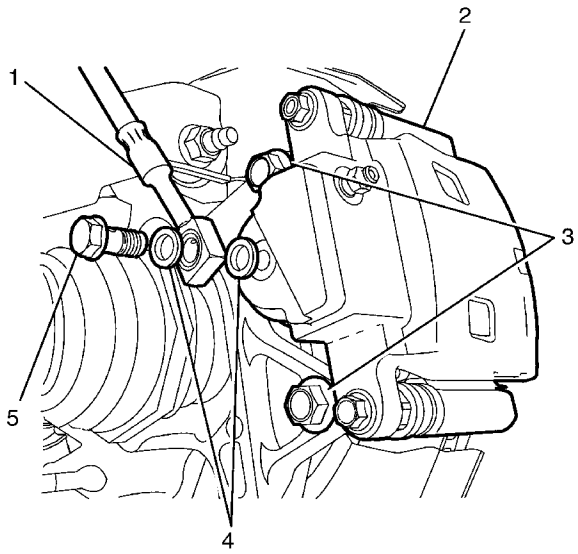
Notice: Refer to Brake Fluid Effects on Paint and Electrical Components Notice in the Preface section.

1. Clean the front brake caliper anchor plate mounting surfaces.
2. Check the serviceability of the brake pads. Refer to Brake Pad Inspection

Important: The inner brake pads (4) are marked as left and right side only.

3. Install the existing or NEW brake pads as required.
4. Press the inner brake pad by using a suitable tool to make sure the brake caliper piston bottoms out in the brake caliper bore.
5. Position the front brake caliper assembly over the brake disc.

Notice: Refer to Fastener Notice in the Preface section.



6. Install the NEW front brake caliper anchor plate to front steering knuckle retaining bolts (3).

Tighten
Tighten the bolt to 110 Nm (81 lb ft).

Notice: Make sure the brake hose is not twisted or kinked after installation. Damage to the hose could result.

7. Install the front brake hose (1) to brake caliper banjo retaining bolt (5) and NEW copper sealing washers (4) to the brake caliper (2).

Tighten
Tighten the banjo bolt to 35 Nm (26 lb ft).

8. Bleed the braking system. Refer to Hydraulic Brake System Bleeding .

9. Remove the two wheel nuts retaining the brake disc to the hub.
10. Install the rear wheels. Refer to Tire and Wheel Removal and Installation .
11. Lower the vehicle to the ground.
12. With the engine OFF, gradually apply the brake pedal to approximately 2/3 of its travel distance.
13. Slowly release the brake pedal.
14. Repeat steps 12 and 13 until a firm brake pedal is obtained. This will correctly seat the brake caliper pistons and brake pads.
15. Fill the master cylinder reservoir to the correct level. Refer to Master Cylinder Reservoir Filling .
16. Burnish (bed in) the brake pads and brake discs if required. Refer to Brake Pad and Rotor Burnishing .

Front Brake Caliper Overhaul

Caution: Refer to Brake Fluid Irritant Caution in the Preface section.

Caution: Refer to Brake Dust Caution in the Preface section.

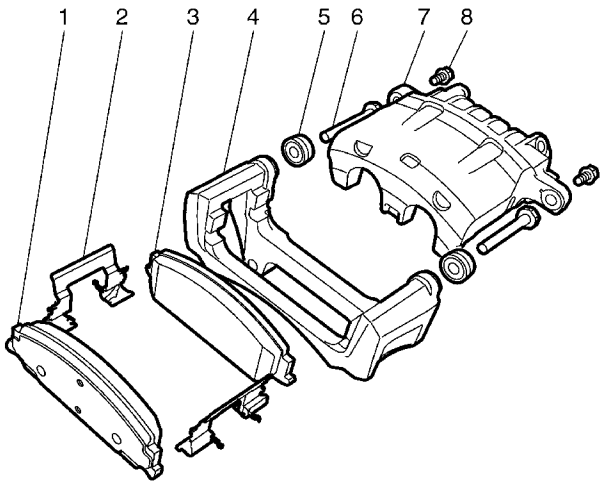
Notice: Refer to Brake Fluid Effects on Paint and Electrical Components Notice in the Preface section.

Disassembly Procedure

Important:

- Replace all the components included in the repair kit used to service the brake caliper.
- Lubricate the rubber parts with NEW HN-1796 brake fluid to make assembly easier.
- If any hydraulic component is removed or disconnected, it may be necessary to bleed all or part of the brake system.
- The torque values specified are for dry, non-lubricated fasteners.
- Perform the service operations on a clean bench, free from all mineral oil materials.

1. Remove the brake caliper from the vehicle. Refer to Front Brake Caliper Replacement .
2. Drain the brake fluid from the brake caliper.



Important: To remove the guide pin bolts (8) use a suitable tool to hold the flat section on the guide pins (6) whilst loosening the guide pin retaining bolts (8).

3. Remove the guide pin retaining bolts (8).
4. Separate the brake caliper housing (7) from the brake caliper anchor plate (4).
5. Remove the brake pads (1 and 3).
6. Remove the retainer clips (2).

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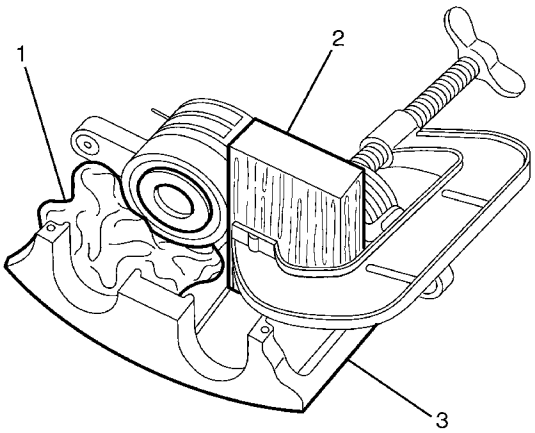
7. Withdraw the guide pins (6) and dust boots (5) from the brake caliper anchor plate (4).

   Separate the dust boots (5) from the guide pins (6).

   Caution: Do not place fingers in front of the caliper piston(s) in an attempt to catch or protect it when applying compressed air. The piston(s) can fly out with force and could result in serious bodily injury.

   Notice: Use clean cloths to pad interior of caliper housing during piston removal. Use just enough air to ease the pistons out of the bores. If the pistons are blown out, even with the padding provided, it may be damaged.

   Important: Observe the pistons coming out of the bores. If one of the pistons appears to be seized, STOP applying air pressure.



8. Remove the brake caliper pistons by directing low pressure compressed air into the brake caliper inlet hole.

   If one of the pistons appears to be seized, perform the following steps:

   8.1. Place a 25 mm (1 in) block of wood between the brake caliper and the brake caliper piston that was moving freely.

   Important: Position the ends of the G-clamp against the rear of the brake caliper and against the 25 mm (1 in) block of wood.

   8.2. Install a large G-clamp over the body of the brake caliper.

   8.3. Remove the brake seized caliper piston by directing low pressure compressed air into the brake caliper inlet hole.

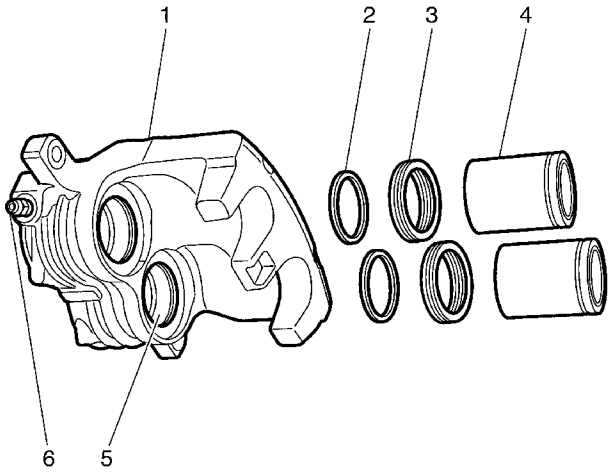
   8.4. Remove the G-clamp from the brake caliper.

8.5. Remove the block of wood from the brake caliper.

9. Install clean workshop cloths (1) to pad the interior of the brake caliper (3) between the remaining brake caliper piston and the body of the brake caliper (3).
10. To cover the open brake caliper bore place a 25 mm (1 in) block of wood (2) between the body of the brake caliper (3) and the brake caliper dust boot seal.

Important: Position the ends of the G-clamp against the rear of the brake caliper (3) and against the 25 mm (1 in) block of wood (2).

11. Install a large G-clamp over the body of the brake caliper (1).
12. Remove the brake caliper piston by directing low pressure compressed air into the brake caliper inlet hole.
13. Remove the G-clamp form the brake caliper (3).
14. Remove the block of wood (2) from the brake caliper (3).



Important: Use a small wooden or plastic tool to avoid damage to the brake caliper (1).

Important: Brake caliper seals are single use components only and must be discarded after removal.

15. With the brake caliper pistons (4) removed, remove the brake caliper piston dust boot seal (3) from the brake caliper (1).

    Discard the brake caliper piston dust boot seal (3).

16. Remove the brake caliper piston seal (2) from the brake caliper (1).

    Discard the brake caliper piston seal (2).

17. Remove the brake caliper bleeder valve (6).
18. Inspect the brake caliper anchor plate guide surfaces for corrosion and wear.

    Replace the brake caliper assembly if damaged or worn.

19. Clean the brake caliper piston bores (5) with denatured alcohol, or equivalent.

    Important: DO NOT use abrasives to clean the brake caliper assembly.

20. Clean the brake caliper pistons (4) with denatured alcohol, or equivalent.
21. Clean the brake caliper bleeder valve (6).
22. Dry the brake caliper piston bores (5) with non-lubricated, filtered air.
23. Dry the brake caliper pistons (4) with non-lubricated, filtered air.
24. Dry the brake caliper bleeder valve (6) with non-lubricated, filtered air.
25. Inspect the brake caliper bores (5) for cracks, scoring, pitting, too much corrosion.

    If cracks, scoring, pitting, and too much corrosion are present in the brake caliper bores (5), replace the brake caliper assembly.

26. Inspect the brake caliper pistons (4) for cracks, scoring, and/or damage.

    If cracks, scoring, and/or damage are present in the brake caliper pistons (4), replace the brake caliper pistons (4) if any of these conditions exist.

Caution: Refer to Brake Fluid Irritant Caution in the Preface section.

Caution: Refer to Brake Dust Caution in the Preface section.

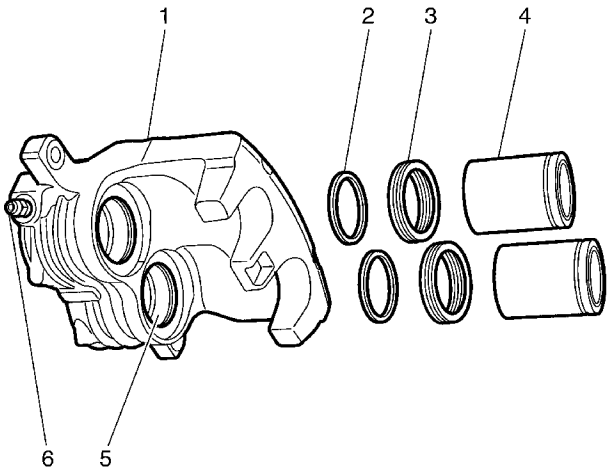
Notice: Refer to Brake Fluid Effects on Paint and Electrical Components Notice in the Preface section.

Assembly Procedure

Important:

- Replace all the components included in the repair kit used to service the brake brake caliper.
- Lubricate the rubber parts with NEW HN 1796 brake fluid to make assembly easier.
- If any hydraulic component is removed or disconnected, it may be necessary to bleed all or part of the brake system.
- The torque values specified are for dry, non-lubricated fasteners.
- Perform the service operations on a clean bench, free from all mineral oil materials.

Notice: Refer to Fastener Notice in the Preface section.



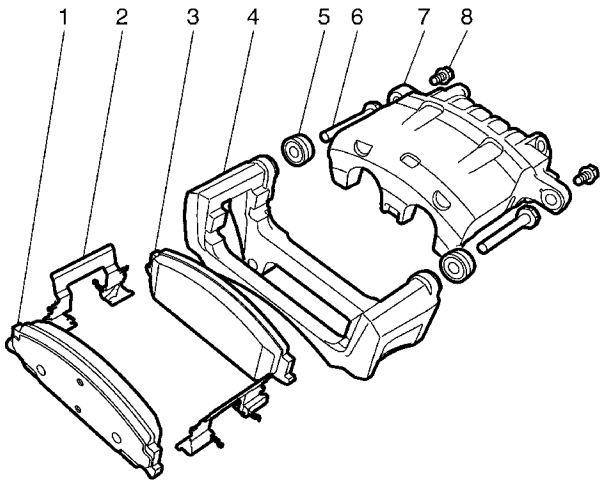
1. Install the brake caliper bleeder valve (6).

   Tighten
   Tighten the bleeder valve to 12 Nm (106 lb in).

2. Lubricate the NEW brake caliper piston seals (2) with Super DOT 4 or DOT 4 Plus brake fluid from a clean, sealed brake fluid container.

   Important: When installing, make sure the brake caliper piston seals (2) are not twisted.

3. Install the brake caliper piston seals (2) into the seal grooves in the brake caliper bores (5).
4. Lubricate the brake caliper bores (5) and pistons (4) with brake fluid.
5. Install the brake caliper pistons (4) into the caliper bores (5).
6. Install the NEW brake caliper piston dust boot seals (3) over the brake caliper pistons (4).
7. Complete the following for both brake caliper piston dust boot seals (3).
   7.1. Fully seat the brake caliper piston dust boot seal (4) into the brake caliper (1).
   7.2. Make sure the brake caliper piston dust boot seal (4) is correctly seated into the groove in the brake caliper bore (5).



8. Lubricate the guide pins (6) with silicone grease, such as Dow Corning No. 44 or equivalent.
9. Install guide pins (6) into the brake caliper anchor plate (4).

   Do not fit the two guide pin boots (5) at this stage.

   Important: To install the guide pin bolts (8) use an open-end spanner to hold the flat section on the guide pins (6) whilst installing the guide pin bolts (8).

10. Install the brake caliper (7) to the brake caliper anchor plate (4) and install NEW guide pin bolts (8).

    Tighten
    Tighten the guide pin bolts to 42 Nm (31 lb ft).

    Important: Make sure that the brake caliper (7) and guide pins (6) slide in and out easily from the brake caliper anchor plate (4). If any binding is evident, then steps 8 and 9 must be repeated.

11. Detach the brake caliper (7) from the brake caliper anchor plate (4) and install the NEW guide pin boots (5) to the guide pins (6).
12. Install the brake pad retainers (2) to the brake caliper anchor plate (4).

    Important: The brake pads (1 and 3) are marked as inner and outer only. Failure to install the front brake pads (1 and 3) in their correct position will cause the brake pads (1 and 3) not to seat correctly in the brake caliper (7).

13. Install the brake pads (1 and 3) to the brake caliper anchor plate (4).

    Important: Remove all excess air from the guide pin boot (5) and make sure that each guide pin boot (5) is correctly located in the grooves in the guide pin (6) and brake caliper anchor plate (4).

14. Assemble the brake caliper (7) and brake caliper anchor plate (4) together.

15. Install the brake caliper assembly to the vehicle. Refer to Front Brake Caliper Replacement .

Rear Brake Caliper Overhaul

Caution: Refer to Brake Fluid Irritant Caution in the Preface section.

Caution: Refer to Brake Dust Caution in the Preface section.

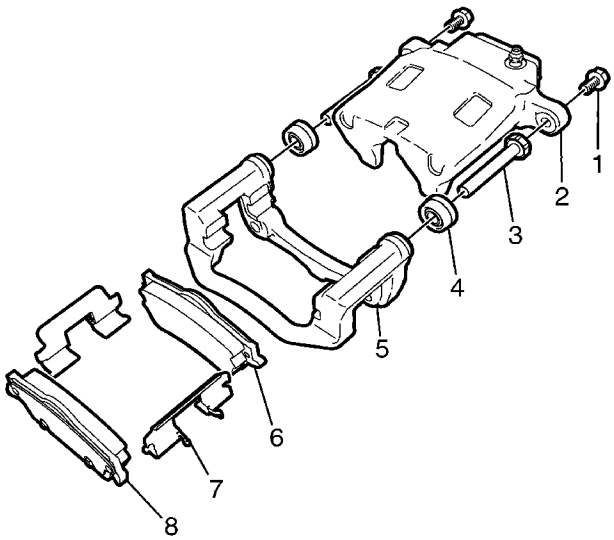
Notice: Refer to Brake Fluid Effects on Paint and Electrical Components Notice in the Preface section.

Disassembly Procedure

Important:

- Replace all the components included in the repair kit used to service the brake caliper.
- Lubricate the rubber parts with NEW HN 1796 brake fluid to make assembly easier.
- If any hydraulic component is removed or disconnected, it may be necessary to bleed all or part of the brake system.
- The torque values specified are for dry, non-lubricated fasteners.
- Perform the service operations on a clean bench, free from all mineral oil materials.

1. Remove the brake caliper from the vehicle. Refer to Rear Brake Caliper Replacement .
2. Drain the brake fluid from the brake caliper.



Important: To remove the guide pin bolts (1) use a suitable tool to hold the flat section on the guide pins (3) whilst loosening the guide pin bolts (1).

3. Remove the guide pin retaining bolts (1).
4. Separate the brake caliper housing (2) from the brake caliper anchor plate (5).
5. Remove the brake pads (6 and 8).
6. Remove the retainer clips (7)

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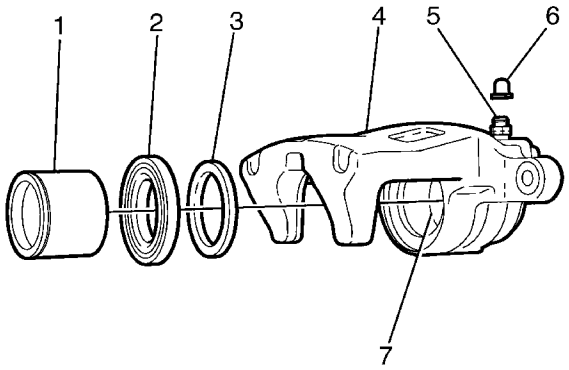
7. Withdraw the guide pins (3) and dust boots (4) from the brake caliper anchor plate (5).
8. Separate the dust boots (4) from the guide pins (3).



Caution: Do not place fingers in front of the caliper piston(s) in an attempt to catch or protect it when applying compressed air. The piston(s) can fly out with force and could result in serious bodily injury.

Notice: Use clean cloths to pad interior of caliper housing during piston removal. Use just enough air to ease the pistons out of the bores. If the pistons are blown out, even with the padding provided, it may be damaged.

9. Install clean cloths to pad the interior of the caliper (4) between the caliper piston (1) and the caliper (4).
10. Carefully remove the brake caliper piston (1) by directing low pressure compressed air into the brake caliper (1) inlet hole.

Important: Use a small wooden or plastic tool to avoid damage to the brake caliper (4).

Important: Brake caliper seals are single use components only and must be discarded after removal.

11. With the brake caliper piston (1) removed, remove the brake caliper piston dust boot seal (2) from the brake caliper (4).

    Discard the brake caliper piston dust boot seal (2).

12. Remove the brake caliper piston seal (3) from the brake caliper (4) and discard the brake caliper piston seal (3).

    Discard the brake caliper piston seal (3).

13. Remove the brake caliper bleeder valve cap (6).
14. Remove the brake caliper bleeder valve (5).

15. Inspect the brake caliper anchor plate guide surfaces for corrosion and wear. Replace the brake caliper assembly if damaged or worn.
16. Clean the brake caliper piston bore (7) with denatured alcohol, or equivalent.

Important: DO NOT use abrasives to clean the brake caliper piston (1).

17. Clean the brake caliper piston (1) with denatured alcohol, or equivalent.
18. Clean the brake caliper bleeder valve (5)
19. Dry the brake caliper piston bore (7) with non-lubricated, filtered air.
20. Dry the brake caliper piston (1) with non-lubricated, filtered air.
21. Dry the brake caliper bleeder valve (5) with non-lubricated, filtered air.
22. Inspect the brake caliper bore (7) for cracks, scoring, pitting, too much corrosion.
23. If light corrosion is present in the brake caliper bore (7), attempt to remove the imperfection with a fine emery paper. If the imperfection cannot be removed, replace the brake caliper assembly.
24. If cracks, scoring, pitting, and too much corrosion are present in the brake caliper bore (7), replace the brake caliper assembly.
25. Inspect the brake caliper piston (1) for cracks, scoring, and/or damage, replace the brake caliper piston (1) if any of these conditions exist.

Caution: Refer to Brake Fluid Irritant Caution in the Preface section.

Caution: Refer to Brake Dust Caution in the Preface section.

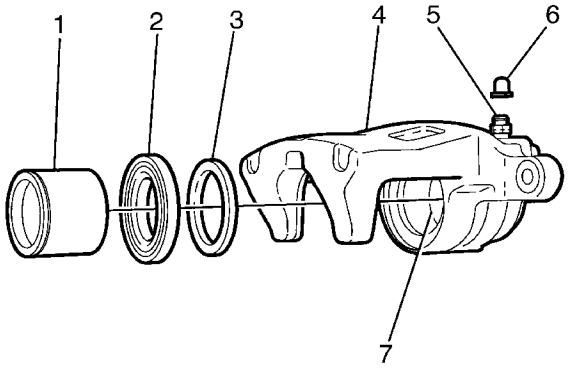
Notice: Refer to Brake Fluid Effects on Paint and Electrical Components Notice in the Preface section.

Assembly Procedure

Important:

- Replace all the components included in the repair kit used to service the brake caliper.
- Lubricate the rubber parts with NEW Super DOT 4 or DOT 4 Plus brake fluid to make assembly easier.
- If any hydraulic component is removed or disconnected, it may be necessary to bleed all or part of the brake system.
- The torque values specified are for dry, non-lubricated fasteners.
- Perform the service operations on a clean bench, free from all mineral oil materials.

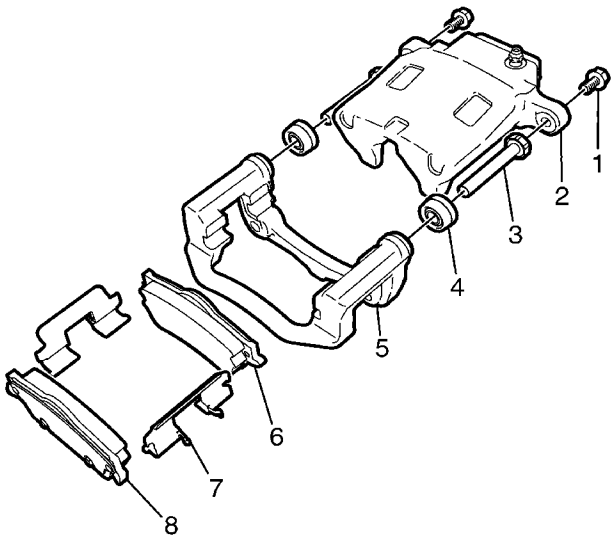
Notice: Refer to Fastener Notice in the Preface section.



1. Install the brake caliper bleeder valve (6) to the brake caliper (4).

   Tighten
   Tighten the brake caliper bleeder valve when dry 12 Nm (106 lb in).

2. Install the brake caliper bleeder valve cap (7) to the brake caliper bleeder valve (6).
3. Lubricate the NEW brake caliper piston seal (3) with Super DOT 4 or DOT 4 Plus brake fluid from a clean, sealed brake fluid container.
4. Install the lubricated brake caliper piston seal (3) into the seal groove in the brake caliper bore (7). Make sure the brake caliper piston seal (3) is not twisted.
5. Lubricate the brake caliper bore (7) and the brake caliper piston (1) with brake fluid.
6. Install the brake caliper piston (1) into the brake caliper bore (7).
7. Install the NEW brake caliper piston dust boot seal (2) over the brake caliper piston (1).
8. Complete the following for the brake caliper piston dust boot seal (2).
   8.1. Fully seat the brake caliper piston dust boot seal (2) into the brake caliper (4).
   8.2. Make sure the brake caliper piston dust boot seal (2) is correctly seated into the groove in the brake caliper bore (7).



9. Lubricate the guide pins (1) with silicone grease, such as Dow Corning No. 44 or equivalent.
10. Install guide pins (1) into the brake caliper anchor plate (5).

    Do not fit the two guide pin boots (2) at this stage.

11. Install the brake caliper (4) to the brake caliper anchor plate (5) and install NEW guide pin bolts (3).
12. Use an open-end spanner to hold the guide pin flat section, tighten the NEW guide pin bolts (3) to the correct torque.

    Tighten
    Tighten the guide pin bolt to 42 Nm (31 lb ft).

    Important: Make sure that the brake caliper and guide pins slide in and out easily from the brake caliper anchor plate. If any binding is evident, then steps 9-12 must be repeated.

13. Detach the brake caliper (4) from the brake caliper anchor plate (5) and install the NEW guide pin boots (4) to the guide pins (3).

    Important: Remove all excess air from the guide pin boot and make sure that each guide pin boot is correctly located in the guide pin and brake caliper anchor plate grooves.

14. Assemble the brake caliper (4) and brake caliper anchor plate (5) together.
15. Install the brake pads. Refer to Rear Disc Brake Pads Replacement .
16. Install the brake caliper to the vehicle. Refer to Rear Brake Caliper Replacement .

Front Brake Rotor Replacement

Removal Procedure

Caution: Refer to Safety Glasses Caution in the Preface section.

Caution: Refer to Brake Fluid Caution in the Preface section.

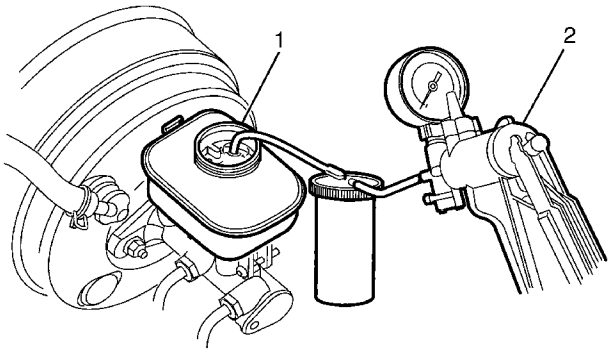
Caution: Refer to Vehicle Lifting Caution in the Preface section.

Caution: Refer to Brake Dust Caution in the Preface section.

Caution: Refer to Brake Fluid Irritant Caution in the Preface section.

Notice: Refer to Brake Fluid Effects on Paint and Electrical Components Notice in the Preface section.

Notice: When adding fluid to the brake master cylinder reservoir, use only Holden specification number HN 1796 (Super DOT 4/DOT 4 Plus) brake fluid from a clean, sealed brake fluid container. The use of any type of fluid other than the recommended type of brake fluid may cause contamination which may result in damage to the internal rubber seals and/or rubber linings of hydraulic brake system components.



1. Inspect the fluid level in the brake master cylinder reservoir (1).
   - If the brake fluid level is midway between the maximum-fill level and the minimum allowable level, no brake fluid needs to be removed from the master cylinder reservoir before proceeding.

Important: DO NOT reuse the removed fluid.

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- If the brake fluid level is higher than midway between the maximum-fill level and the minimum allowable level, syphon the brake fluid to the midway point using a hand vacuum pump (2) before proceeding.

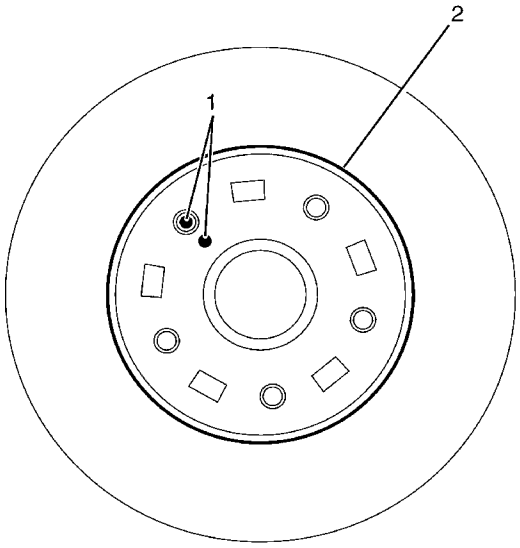
2. Raise and support the vehicle. Refer to Lifting and Jacking the Vehicle .
3. Remove the front wheels. Refer to Tire and Wheel Removal and Installation .

Important: DO NOT disconnect the hydraulic brake flexible hose from the brake caliper otherwise complete bleeding of the braking system will be necessary.

4. Remove the front brake caliper. Refer to Front Brake Caliper Replacement .

Notice: Support the brake caliper with heavy mechanic wire, or equivalent, whenever it is separated from its mount and the hydraulic flexible brake hose is still connected. Failure to support the caliper in this manner will cause the flexible brake hose to bear the weight of the caliper, which may cause damage to the brake hose and in turn may cause a brake fluid leak.

5. Support the brake caliper with heavy mechanic's wire or equivalent.



Important: The brake disc to hub relationship is indexed during production. Mark the relationship of the brake disc to a wheel stud end for installation to minimise the potential of brake shudder.

Important: If the brake disc is being removed to be machined or replaced to rectify brake shudder, or if brake disc to hub matching is not evident, the brake disc to the hub must be indexed. Refer to Brake Rotor Assembled Lateral Runout Correction - Indexing .

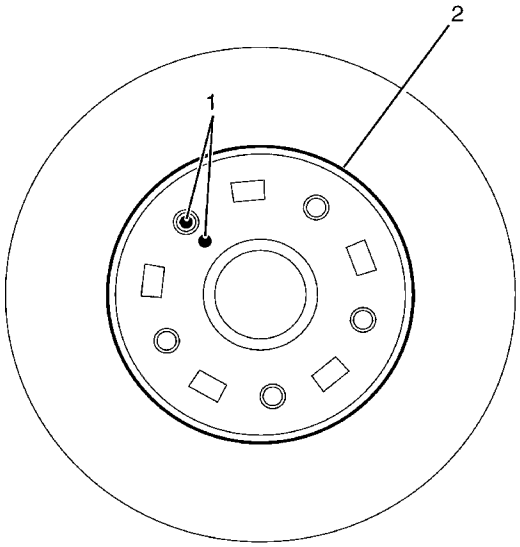
6. Matchmark the position of the brake disc (2) to the wheel studs (1).
7. Remove the brake disc (2).

Installation Procedure

Important: Whenever the brake disc has been separated from the hub/axle flange, any rust

or contaminants should be cleaned from the hub/axle flange and the brake disc mating surfaces. Failure to do this may result in too much assembled lateral runout (LRO) of the brake disc, which may lead to brake pulsation.

1. Clean any rust or corrosion from the mating surface of the hub/axle flange and mounting surface of the brake disc.
2. Inspect the mating surfaces of the hub/axle flange and the brake disc to make sure that there are no foreign particles or debris remaining.



Important: Use the matchmark (1) made prior to removal for correct orientation to the flange.

3. Install the brake disc (2) to the hub/axle flange.
4. If the brake disc (2) was removed and installed as part of a brake system repair, measure the assembled LRO of the brake disc (2) to make sure optimum performance of the disc brakes. Refer to Brake Rotor Assembled Lateral Runout Measurement .
5. If the brake disc (2) assembled LRO measurement exceeds the specification, bring the LRO to within specifications. Refer to Brake Rotor Assembled Lateral Runout Correction .
6. Remove the heavy mechanic's wire or equivalent support from the brake caliper.

Notice: Make sure the brake hose is not twisted or kinked after installation. Damage to the hose could result.

7. Install the front brake caliper. Refer to Front Brake Caliper Replacement .
8. Install the front wheels. Refer to Tire and Wheel Removal and Installation .
9. Lower the vehicle to the ground.
10. With the ignition OFF, gradually apply the brake pedal to approximately 2/3 of its travel distance.
11. Slowly release the brake pedal.
12. Repeat steps 10 and 11 until a firm brake pedal application is obtained. This will correctly seat the brake caliper pistons and brake pads.
13. Fill the master cylinder reservoir to the correct level. Refer to Master Cylinder Reservoir Filling .
14. If the brake rotor was refinished or replaced, or if new brake pads were installed, burnish the

brake pads and brake rotors. Refer to Brake Pad and Rotor Burnishing .

Rear Brake Rotor Replacement

Removal Procedure

Caution: Refer to Safety Glasses Caution in the Preface section.

Caution: Refer to Vehicle Lifting Caution in the Preface section.

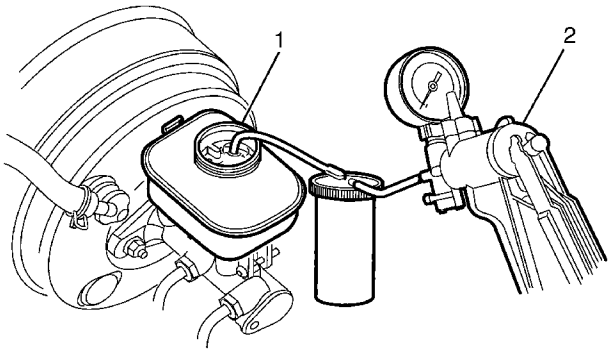
Caution: Refer to Brake Dust Caution in the Preface section.

Caution: Refer to Brake Fluid Caution in the Preface section.

Caution: Refer to Brake Fluid Irritant Caution in the Preface section.

Notice: Refer to Adding Fluid to the Brake System Notice in the Preface section.

Notice: Refer to Brake Fluid Effects on Paint and Electrical Components Notice in the Preface section.



1. Inspect the fluid level in the brake master cylinder reservoir (1).
   - If the brake fluid level is midway between the maximum fill level and the minimum allowable level, no brake fluid needs to be removed from the master cylinder reservoir (1) before proceeding.

Important: DO NOT completely empty the master cylinder reservoir (1) or remove any brake lines otherwise complete bleeding of the braking system will be necessary.

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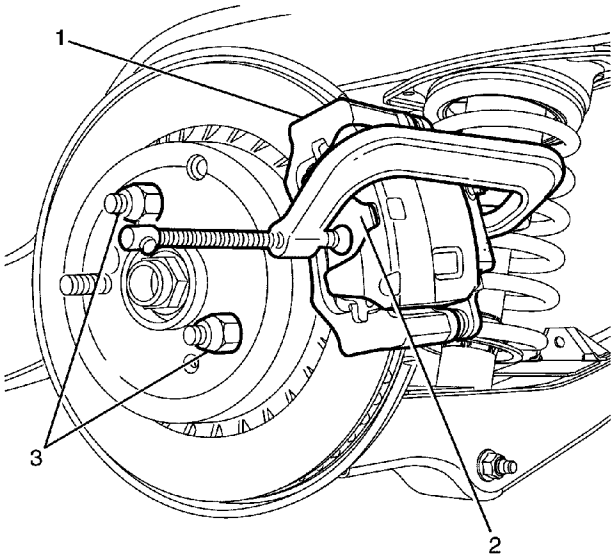
Important: DO NOT re use the removed fluid.

- If the brake fluid level is higher than midway between the maximum fill level and the minimum allowable level, syphon the brake fluid to the midway point using a hand vacuum pump (2) before proceeding.

Important: Make sure the park brake is fully released.

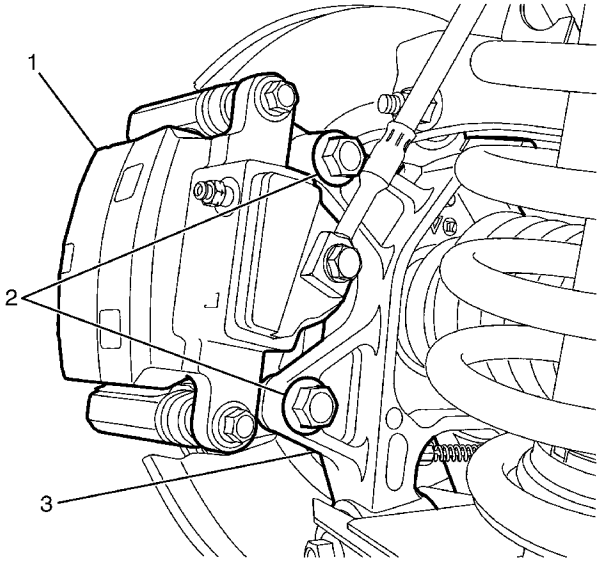
2. Disengage the park brake.
3. Raise and support the vehicle. Refer to Lifting and Jacking the Vehicle .
4. Remove the rear wheels. Refer to Tire and Wheel Removal and Installation .



5. Install two wheel nuts in reverse (3) to opposite wheel studs to retain the brake disc to the hub.

Important: Position the ends of the G-clamp against the rear of the brake caliper (1) and against the outboard brake pad (2).

6. Install large G-clamp over the body of the brake caliper (1).
7. Tighten the G-clamp until the brake caliper piston bottoms out in the brake caliper bore.
8. Remove the G-clamp from the brake caliper (1).



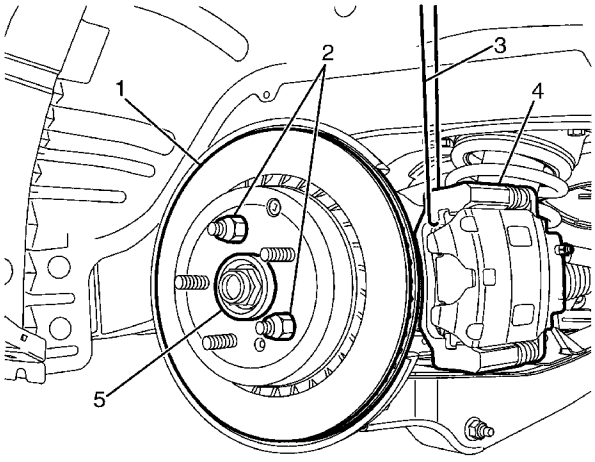
Important: Bolts with micro-encapsulated thread sealant must be discarded after removal.

9. Remove and discard the brake caliper anchor plate to knuckle retaining bolts (2).

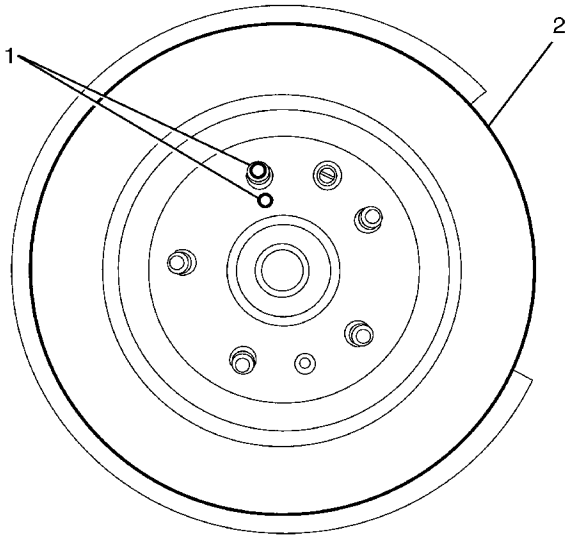
Important: DO NOT disconnect the hydraulic brake flexible hose from the brake caliper otherwise complete bleeding of the braking system will be necessary.

10. Remove the brake caliper (1) from the knuckle (3).

Notice: Refer to Brake Caliper Notice in the Preface section.



11. Support the brake caliper (4) with heavy mechanic's wire, or equivalent (3).
12. Remove the two wheel nuts (2) retaining the brake disc (1) to the hub (5).



Important: The brake disc to hub relationship is indexed during production. Mark the relationship of the brake disc to a wheel stud end for installation to minimise the potential of brake shudder.

Important: If the brake disc is being removed to be machined or replaced to rectify brake shudder, or if brake disc to hub matching is not evident, the brake disc to the hub must be indexed. Refer to Brake Rotor Assembled Lateral Runout Correction - Indexing .

13. Matchmark the position of the brake disc (2) to the wheel studs (1).
14. Remove the brake disc (2).

Installation Procedure

Caution: Refer to Safety Glasses Caution in the Preface section.

Caution: Refer to Vehicle Lifting Caution in the Preface section.

Caution: Refer to Brake Dust Caution in the Preface section.

Caution: Refer to Brake Fluid Caution in the Preface section.

Caution: Refer to Brake Fluid Irritant Caution in the Preface section.

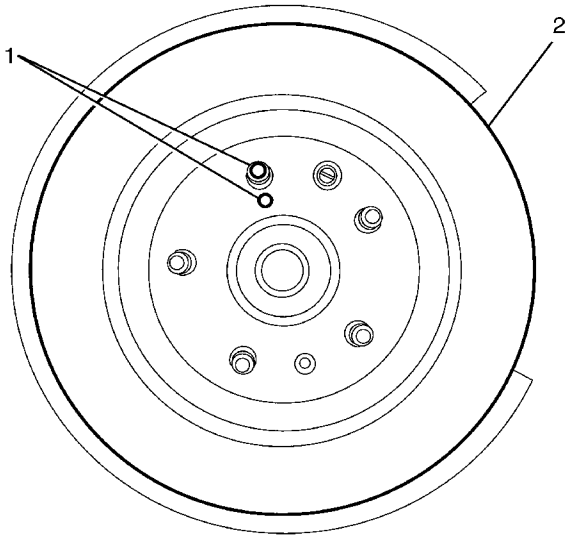
Notice: Refer to Adding Fluid to the Brake System Notice in the Preface section.

Notice: Refer to Brake Fluid Effects on Paint and Electrical Components Notice in the Preface section.

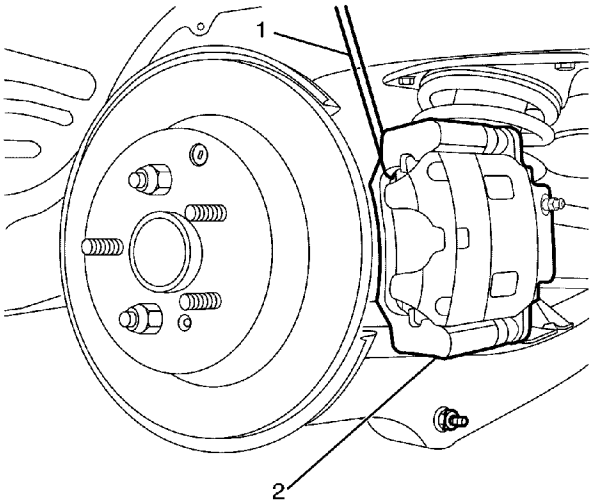
Important: Whenever the brake disc has been separated from the hub/axle flange, any rust

or contaminants should be cleaned from the hub/axle flange and the brake disc mating surfaces. Failure to do this may result in too much assembled lateral runout (LRO) of the brake disc, which may lead to brake pulsation.

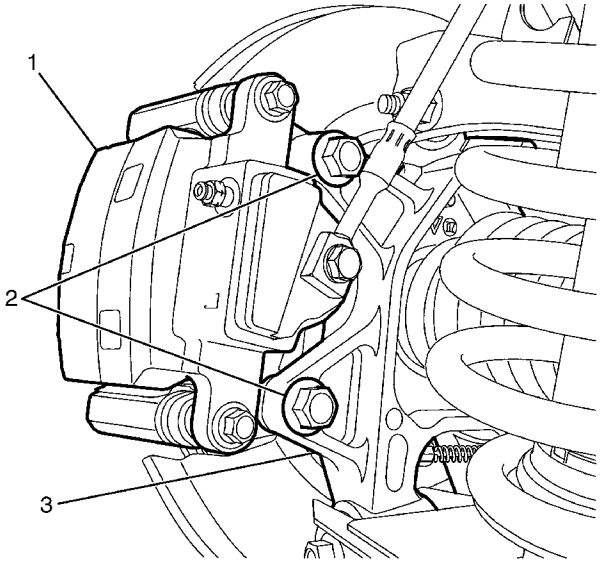
1. Clean any rust or corrosion from the mating surface of the hub/axle flange and mounting surface of the brake disc.
2. Inspect the mating surfaces of the hub/axle flange and the brake disc to make sure that there are no foreign particles or debris remaining.



3. Install the brake disc (2) to the hub/axle flange. Use the matchmark (1) made prior to removal for correct orientation to the flange.
4. If the brake disc was removed and installed as part of a brake system repair, measure the assembled lateral runout (LRO) of the brake disc to make sure optimum performance of the disc brakes. Refer to Brake Rotor Assembled Lateral Runout Measurement .
5. If the brake disc assembled LRO measurement exceeds the specification, bring the LRO to within specifications. Refer to Brake Rotor Assembled Lateral Runout Correction .



6. Remove the heavy mechanic's wire, or equivalent support (1) from the brake caliper (2).



Notice: Make sure the brake hose is not twisted or kinked after installation. Damage to the hose could result.

7. Install the brake caliper assembly (1) to the knuckle (3).

Notice: Refer to Fastener Notice in the Preface section.

8. Install the NEW brake caliper anchor plate to knuckle retaining bolts (2).

Tighten
Tighten the bolts to 110 Nm (82 lb ft).

9. Install the rear wheels. Refer to Tire and Wheel Removal and Installation .
10. Lower the vehicle to the ground.
11. With the engine OFF, gradually apply the brake pedal to approximately 2/3 of its travel distance.
12. Slowly release the brake pedal.
13. Repeat steps 11 and 12 until a firm brake pedal is obtained. This will correctly seat the brake caliper pistons and brake pads.
14. Fill the master cylinder reservoir to the correct level. Refer to Master Cylinder Reservoir Filling .
15. If the brake disc was refinished or replaced, or if new brake pads were installed, burnish the brake pads and brake discs. Refer to Brake Pad and Rotor Burnishing .

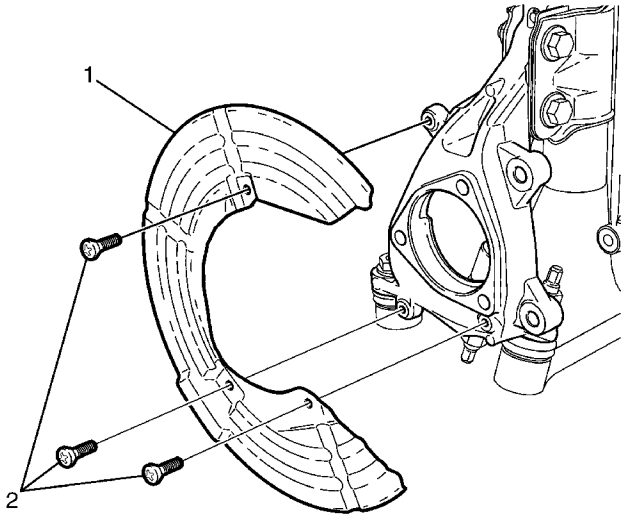
Front Brake Shield Replacement

Removal Procedure

Caution: Refer to Safety Glasses Caution in the Preface section.

Caution: Refer to Vehicle Lifting Caution in the Preface section.

1. Raise and support the vehicle. Refer to Lifting and Jacking the Vehicle .
2. Remove the front wheel. Refer to Tire and Wheel Removal and Installation .
3. Remove the front wheel hub assembly. Refer to Front Wheel Bearing and Hub Replacement .



4. Remove the brake disc splash shield to steering knuckle retaining bolts (2).
5. Remove the brake disc splash shield (1).

Installation Procedure

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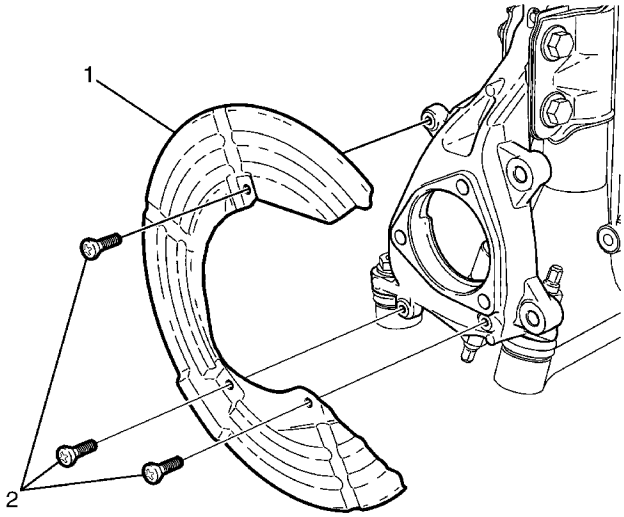


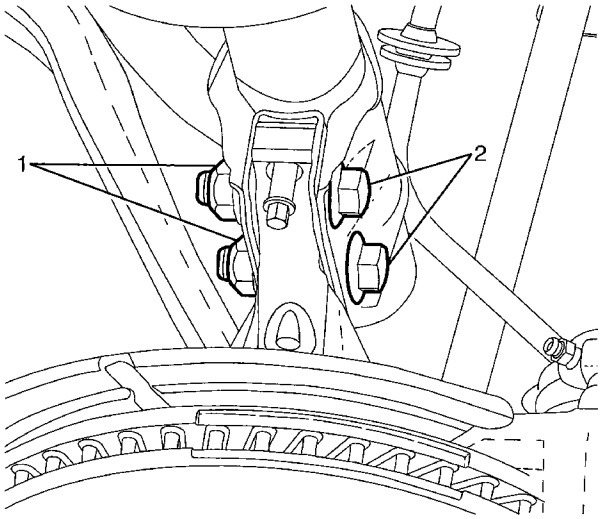
1. Install the brake disc splash shield (1).

   Notice: Refer to Fastener Notice in the Preface section.

2. Install the brake disc splash shield to steering knuckle retaining bolts (2).

   Tighten
   Tighten the nut to 9 Nm (89 lb in).

3. Install the front wheel hub assembly. Refer to Front Wheel Bearing and Hub Replacement .



Important: If the steering knuckle has been replaced, the end-float measurement must be inspected.

4. Install the front wheel. Refer to Lifting and Jacking the Vehicle .
5. Remove the safety stands.
6. Lower the vehicle to the ground.
7. Bounce the vehicle several times to settle the suspension.
8. Inspect and adjust the wheel alignment. Refer to Wheel Alignment Measurement .
9. Tighten the strut assembly to steering knuckle retaining bolts (2) and nuts (1).

Tighten
Tighten the bolts a first pass to 85 N·m (63 lb in).

Tighten
Tighten the bolts a second pass to 100 N·m (74 lb in).

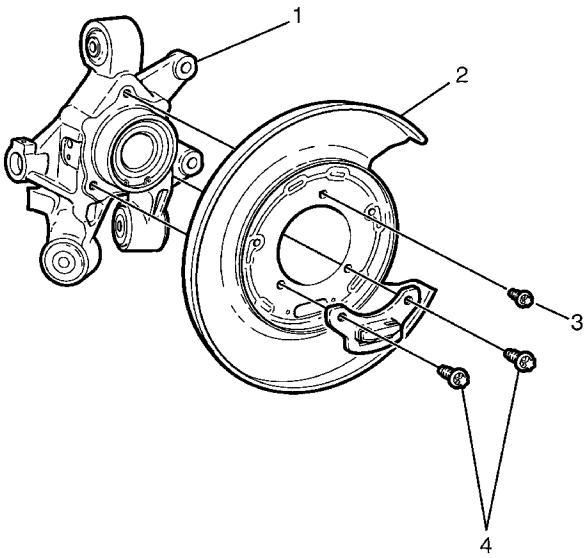
Tighten
Tighten the bolts an additional 90 degrees.

Rear Disc Brake Backing Plate Replacement

Removal Procedure

Caution: Refer to Safety Glasses Caution in the Preface section.

1. Remove the wheel hub and knuckle assembly. Refer to Knuckle Replacement.
2. Remove the wheel hub. Refer to Rear Wheel Bearing and Hub Replacement.



3. Remove the disc brake backing plate to knuckle retaining bolts (3 and 4).
4. Remove the disc brake backing plate (2) from the knuckle (1).

Installation Procedure

Notice: Refer to Fastener Notice in the Preface section.

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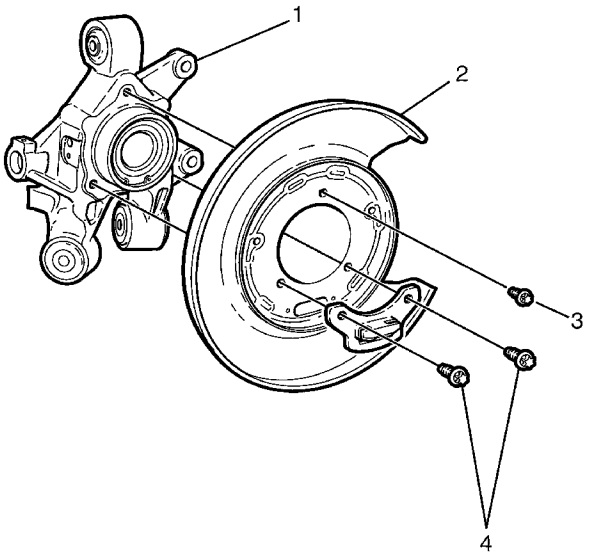

1. Install the disc brake backing plate (2) to the knuckle (1).
2. Install the upper disc brake backing plate to knuckle retaining bolt (3).

   Tighten
   Tighten the bolts to 60 Nm (44 lb ft).

3. Install the lower disc brake backing plate to knuckle retaining bolts (4).

   Tighten
   Tighten the bolts to 130 Nm (96 lb ft).

4. Install the wheel hub. Refer to Rear Wheel Bearing and Hub Replacement.
5. Install the wheel hub and knuckle assembly. Refer to Knuckle Replacement.

Fastener Tightening Specifications

Application	Specification	
	Metric	English
Brake Hose to Caliper Banjo Bolt	35 Nm	26 lb ft
Brake Master Cylinder Reservoir to Brake Master Cylinder Retaining Screw	2 Nm	18 lb in
Brake Master Cylinder to Vacuum Brake Booster Retaining Nut	10 Nm	89 lb in
Brake Pedal Assembly to Bulkhead Retaining Nut	22 Nm	16 lb ft
Brake Pedal Bracket Assembly to I/P Crossmember Retaining Bolt	22 Nm	16 lb ft
Brake Pedal Position Sensor to Brake Pedal Bracket Retaining Bolt	2 Nm	18 lb in
Brake Pipe Fitting at Brake Pressure Modulator Valve (BPNV)	15 Nm	11 lb ft
Brake Pipe Fitting at Master Cylinder	15 Nm	11 lb ft
Brake Pipe Fitting at Brake Hose	15 Nm	11 lb ft
Front Brake Hose Inner Wheel House to Frame Retaining Bolt	9 Nm	80 lb in
Front Brake Caliper Anchor Plate to Steering Knuckle Retaining Bolt	60 Nm +120°	44 lb ft +120°
Intermediate Brake Pipe to Brake Pipe Union	15 Nm	11 lb ft
Rear Brake Caliper to Knuckle Retaining Bolt	110 Nm	81 lb ft
Vacuum Brake Booster to Bulkhead Retaining Nuts	22 Nm	16 lb ft

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Brake Component Specifications

Application	Specification	
	Metric	English
Brake Caliper Bleeder Valve	12 N·m	106 lb in

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Brake System Specifications

Component	Application	Specification
Brake Fluid	Type	DOT 4 or Super DOT 4
	Capacity	0.9 Litres (0.95 quarts)
Brake Booster	Make	Mando Corporation
	Type	Tandem Vacuum Suspended
	Size	203 mm (8 in) or 229 mm (9 in)
Master Cylinder	Type	Fore/aft split
	Bore Size	26 mm (1.023 in)
	Nominal Stroke	37 mm (1.456 in)
Brake Pedal Travel	Maximum Specification with 445 Nm (100 lbs) of force applied to the pedal with the ignition OFF and the booster power reserve depleted.	90 mm (3.54 in)

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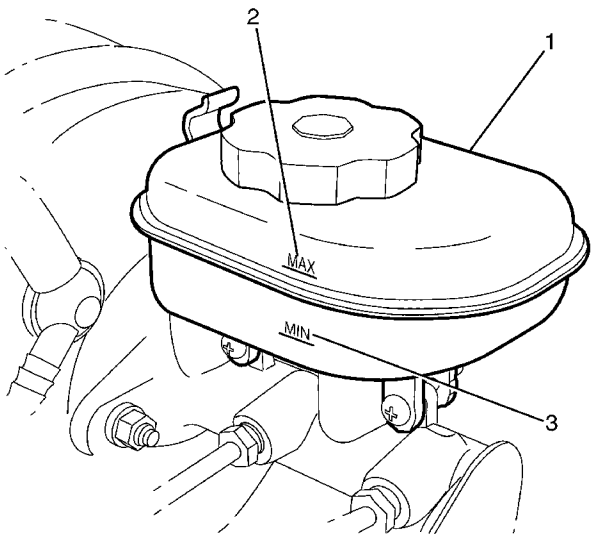
Master Cylinder Reservoir Filling

Caution: Refer to Brake Fluid Caution in the Preface section.

Caution: Refer to Brake Fluid Irritant Caution in the Preface section.

Notice: Refer to Adding Fluid to the Brake System Notice in the Preface section.

Notice: Refer to Brake Fluid Effects on Paint and Electrical Components Notice in the Preface section.



1. Visually inspect the brake fluid level in the master cylinder reservoir (1).
2. If the brake fluid level is at or below the minimum allowable level (3) during routine fluid inspections, the brake system should be inspected for wear and possible brake fluid leaks.
3. If the brake fluid level is at or below the minimum allowable level (3) and an inspection of the brake system did not reveal wear or brake fluid leaks, the brake fluid may be topped up to the maximum fill level (2).

Important: If brake fluid is to be added to the master cylinder reservoir (1), clean the outside and around the reservoir cap prior to removal.

4. If a brake system service was just completed, the brake fluid may be topped up to the maximum fill level (2).
5. If the brake fluid level is above the minimum allowable level (3), adding brake fluid is not recommended under normal conditions.

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Master Cylinder Reservoir Replacement

Removal Procedure

Caution: Refer to Battery Disconnect Caution in the Preface section.

1. Disconnect the battery ground cable. Refer to Battery Negative Cable Disconnection and Connection .

   Caution: Refer to Brake Fluid Caution in the Preface section.

   Caution: Refer to Brake Fluid Irritant Caution in the Preface section.

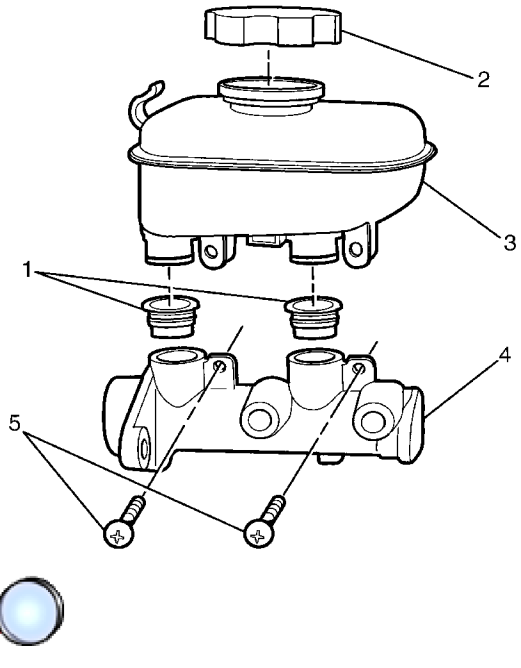
   Notice: Refer to Adding Fluid to the Brake System Notice in the Preface section.

   Notice: Refer to Brake Fluid Effects on Paint and Electrical Components Notice in the Preface section.

2. Apply the park brake and chock the wheels.

   Important: With the ignition OFF and the brakes cool, apply the brakes three to five times, or until the brake pedal effort increases significantly, in order to deplete the vacuum brake booster power reserve.

3. Deplete the vacuum brake booster power reserve.
4. Remove the master cylinder. Refer to Master Cylinder Replacement .



5. Remove the master cylinder reservoir to master cylinder retaining screws (4).

   Important: To remove the master cylinder reservoir (2) grasp the master cylinder (3) then pull up on the master cylinder reservoir (2).

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6. Remove the master cylinder reservoir (2) from the master cylinder (3).

   Important: Master cylinder reservoir seals (1) are single use only components and will not reseal. Install NEW master cylinder reservoir seals (1) whenever the master cylinder reservoir (2) is removed from the master cylinder (3).

7. Remove the two master cylinder reservoir seals (1) from the master cylinder (3).

   Discard the two master cylinder reservoir seals (1).

Installation Procedure

Caution: Refer to Brake Fluid Caution in the Preface section.

Caution: Refer to Brake Fluid Irritant Caution in the Preface section.

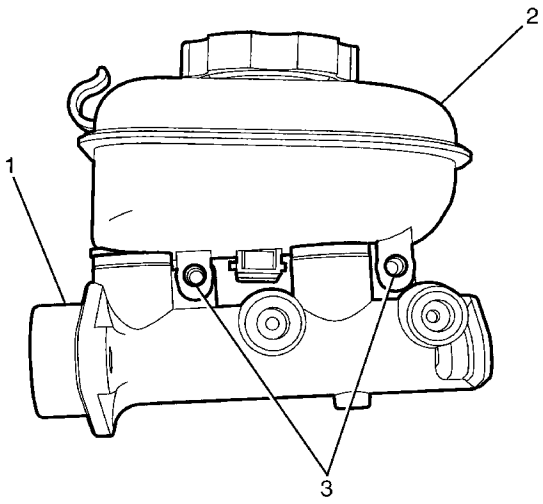
Notice: Refer to Adding Fluid to the Brake System Notice in the Preface section.

Notice: Refer to Brake Fluid Effects on Paint and Electrical Components Notice in the Preface section.

Important: Lubricate the NEW master cylinder reservoir seals and the outer surface of the NEW master cylinder reservoir to housing barrels with Super DOT 4 or DOT 4 Plus brake fluid from a clean, sealed brake fluid container in order to prevent tearing on installation.

1. Install the NEW master cylinder reservoir seals to the master cylinder body.

   Make sure they are fully seated.

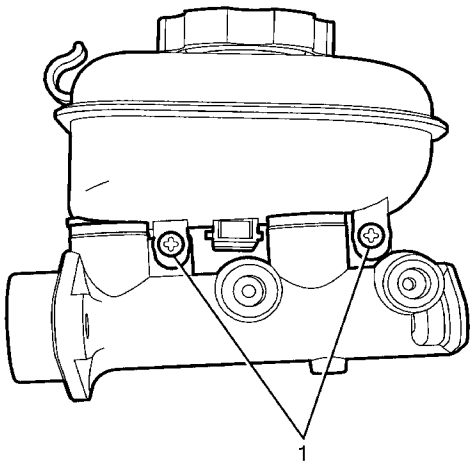


Important: Press down on the master cylinder reservoir (2) until the master cylinder

reservoir to master cylinder retaining screw holes (3) the master cylinder body (1) are aligned.

2. Install the master cylinder reservoir (2) to the master cylinder body (1).

   Notice: Refer to Fastener Notice in the Preface section.



3. Install the master cylinder reservoir to master cylinder retaining screws (1).

   Tighten
   Tighten the screws to 2.0 N·m (18 lb in).

4. Install the master cylinder. Refer to Master Cylinder Replacement .
5. Connect the battery ground cable. Refer to Battery Negative Cable Disconnection and Connection .

Master Cylinder Replacement

Removal Procedure

Caution: Refer to Battery Disconnect Caution in the Preface section.

1. Disconnect the battery ground cable. Refer to Battery Negative Cable Disconnection and Connection I.

   Caution: Refer to Brake Fluid Caution in the Preface section.

   Caution: Refer to Brake Fluid Irritant Caution in the Preface section.

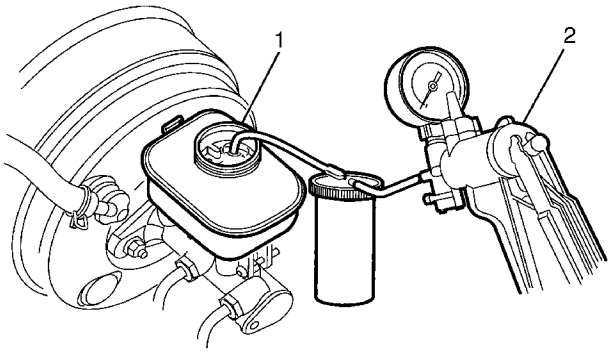
   Notice: Refer to Adding Fluid to the Brake System Notice in the Preface section.

   Notice: Refer to Brake Fluid Effects on Paint and Electrical Components Notice in the Preface section.

2. Apply the park brake and chock the wheels.

   Important: With the ignition OFF and the brakes cool, apply the brakes three to five times, or until the brake pedal effort increases significantly, in order to deplete the vacuum brake booster power reserve.

3. Deplete the vacuum brake booster power reserve.
4. Clean the master cylinder, around the brake lines and the reservoir cap.
5. Place a clean suitable container under the master cylinder.
6. Remove the master cylinder reservoir cap.



7. Siphon the brake fluid out of the master cylinder reservoir (1) using a hand vacuum pump (2).

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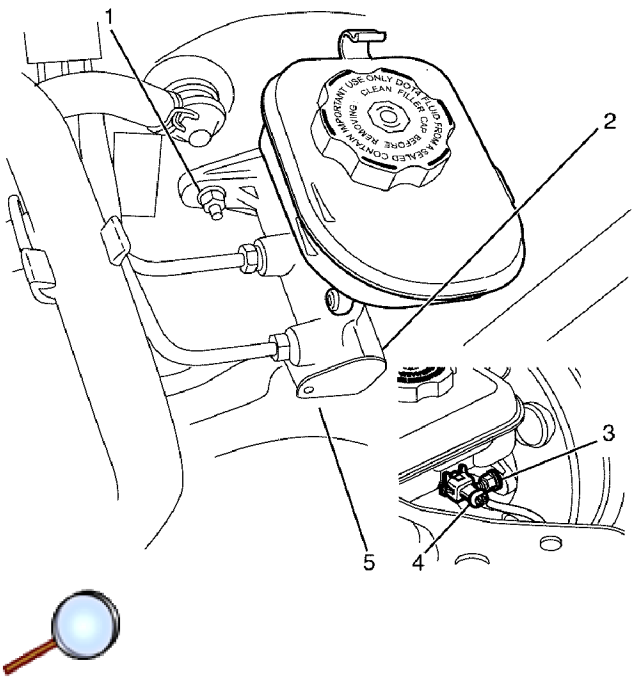
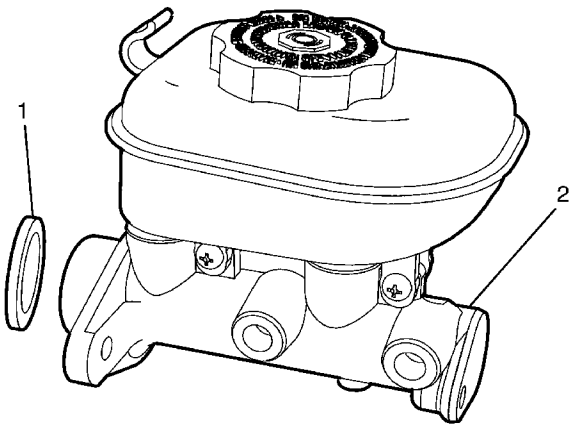


Important: Lift the connector security clip with a suitable tool or equivalent to release the brake fluid level switch electrical connector (8) from the brake fluid level switch.

8. Disconnect the brake fluid level switch electrical connector (4).
9. Disconnect the brake pipes from the master cylinder (2).

Important: Install a rubber cap or plug on the exposed brake pipes (3) in order to prevent fluid loss and contamination.

10. Plug both the exposed brake pipes.
11. Remove the strut tower to master cylinder support bracket retaining nuts (7).
12. Remove the master cylinder support bracket to master cylinder retaining bolt (5).
13. Remove the master cylinder support bracket (5).
14. Remove the master cylinder to vacuum brake booster retaining nuts (1,3).
15. Remove the master cylinder (2) from the vacuum brake booster.



Notice: Do not disturb the brake booster push rod or press the brake pedal when the master cylinder is removed, internal damage to the brake booster may occur.

Important: The vacuum brake booster to master cylinder sealing O-ring (1) is a single use only component and will not reseal. Install a NEW master cylinder sealing O-ring (1) whenever the master cylinder (2) is removed from the vacuum brake booster.

16. Remove the vacuum brake booster to master cylinder sealing O-ring (1) from the master cylinder (2).

    Discard the master cylinder sealing O-ring (1).

Installation Procedure

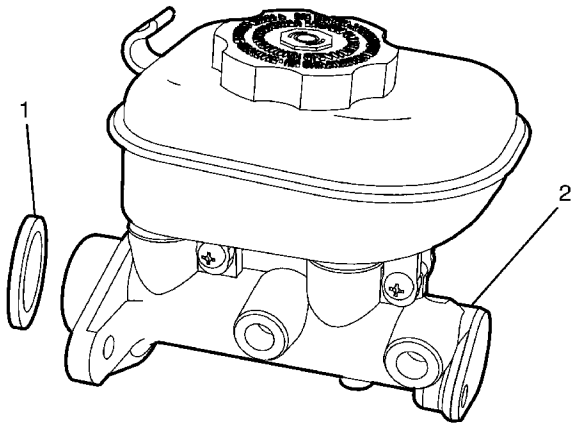
Caution: Refer to Brake Fluid Caution in the Preface section.

Caution: Refer to Brake Fluid Irritant Caution in the Preface section.

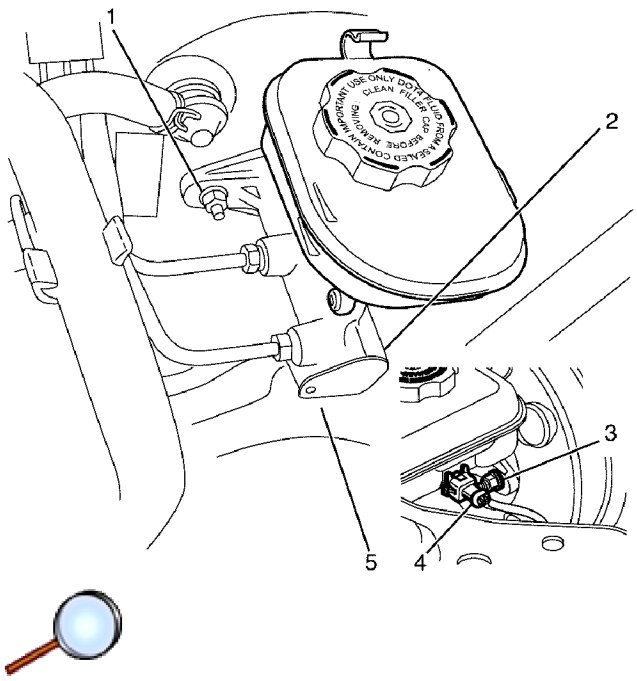
Notice: Refer to Adding Fluid to the Brake System Notice in the Preface section.

Notice: Refer to Brake Fluid Effects on Paint and Electrical Components Notice in the Preface section.

1. Install the master cylinder reservoir. Refer to Master Cylinder Reservoir Replacement .
2. Bench bleed the master cylinder. Refer to Master Cylinder Bench Bleeding .



3. Install a NEW vacuum brake booster to master cylinder sealing O-ring (1) to the master cylinder (2).
4. Place a clean suitable container under the master cylinder (2).



Notice: Do not disturb the brake booster push rod or press the brake pedal when the master cylinder is removed, internal damage to the brake booster may occur.

5. Install the master cylinder (2) to the vacuum brake booster.

Notice: Refer to Fastener Notice in the Preface section.

6. Install the master cylinder to vacuum brake booster retaining nuts (1,3).

Tighten
Tighten the nuts to 10 Nm (89 lb in).

7. Install the master cylinder support bracket (6).
8. Install the master cylinder support bracket to strut tower retaining nuts (7).

Tighten
Tighten the nuts to 23 Nm (17 lb ft).

9. Install the master cylinder support bracket to master cylinder retaining bolt (5).

Tighten
Tighten the bolt to 17 Nm (13 lb ft).

10. Remove the rubber caps from the exposed brake pipes.
11. Connect the brake pipes to the master cylinder (2).

Tighten
Tighten the pipe fittings to 15 Nm (11 lb ft).

12. Connect brake fluid level switch electrical connector (3).

Make sure the security clip is correctly installed.

13. Connect the battery ground cable. Refer to Battery Negative Cable Disconnection and Connection .
14. Bleed the braking system. Refer to Hydraulic Brake System Bleeding .
15. Release the park brake and remove the wheel chocks.

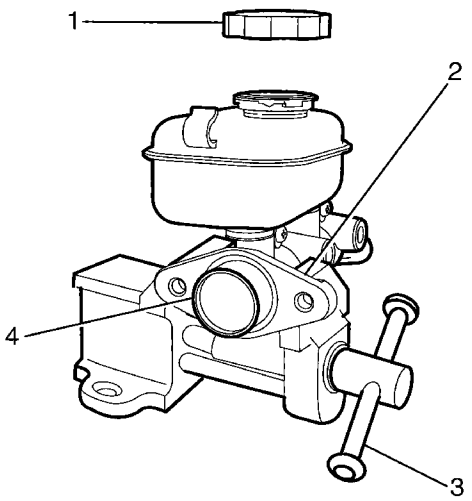
Master Cylinder Bench Bleeding

Caution: Refer to Brake Fluid Caution in the Preface section.

Caution: Refer to Brake Fluid Irritant Caution in the Preface section.

Notice: Refer to Adding Fluid to the Brake System Notice in the Preface section.

Notice: Refer to Brake Fluid Effects on Paint and Electrical Components Notice in the Preface section.



Important: The rear of the primary piston (4) must be accessible.

1. Secure the mounting flange of the brake master cylinder (2) in a bench vice (3).
2. Remove the master cylinder reservoir cap (1).

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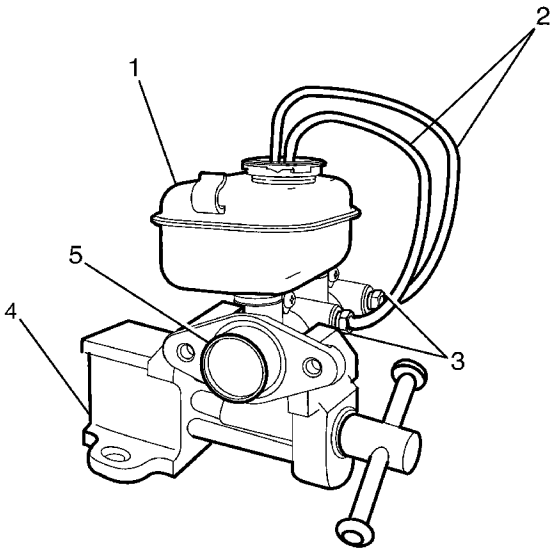


3. Install suitable fittings to the master cylinder ports (5) that match the type of flare seat required and also provide for hose attachment.
4. Install transparent hoses (1) to the fittings installed to the master cylinder ports (5).

   Route the hoses into the master cylinder reservoir (2).

   Important: Brake fluid from a clean, sealed brake fluid container must be used when topping up the brake fluid level.

5. Fill the master cylinder reservoir (2) to the maximum fill level.

   Important: Make sure that the ends of the transparent hoses (1) running into the master cylinder reservoir (2) are fully submerged in the brake fluid.

   Important: As air is bled from the primary and secondary pistons, the effort required to depress the primary piston (3) will increase and the amount of travel will decrease.

   Important: Use a suitable smooth, round-ended tool to depress and release the primary piston (3) as far as it will travel. Observe the flow of fluid coming from the ports.

6. Depress and release the primary piston (3).
7. Continue to depress and release the primary piston (3) until fluid flows freely from the ports with no evidence of air bubbles.
8. Remove the fittings installed to the master cylinder ports (5) and transparent hoses (1).

   Wrap the master cylinder with a clean shop cloth to prevent brake fluid spills.

9. Install the master cylinder reservoir cap.
10. Remove the master cylinder from the vice.

Brake Pedal Assembly Replacement

Removal Procedure

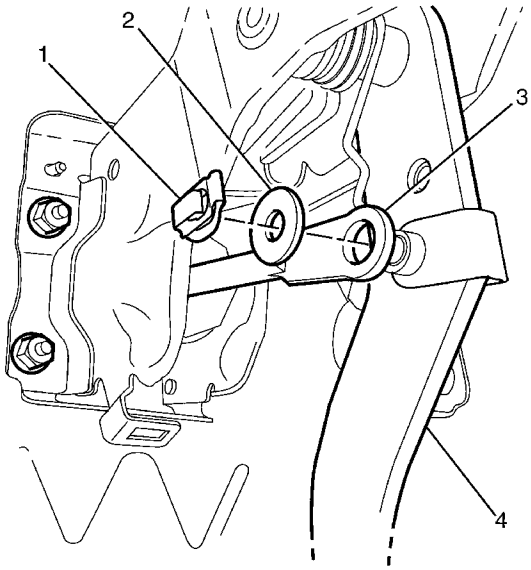
Caution: Refer to Brake Fluid Caution in the Preface section.

Caution: Refer to Brake Fluid Irritant Caution in the Preface section.

Notice: Refer to Adding Fluid to the Brake System Notice in the Preface section.

Notice: Refer to Brake Fluid Effects on Paint and Electrical Components Notice in the Preface section.

1. Remove the knee bolster. Refer to Knee Bolster Replacement .
2. Remove the instrument panel insulator panel. Refer to Instrument Panel Insulator Panel Replacement - Left Side .
3. Remove the instrument panel retainer. Refer to Instrument Panel Retainer Replacement .
4. Remove the master cylinder from the vehicle. Refer to Master Cylinder Replacement .
5. Remove the vacuum hose and check valve from the vacuum brake booster. Refer to Power Brake Booster Inlet Hose Replacement .
6. Remove the brake pedal position sensor. Refer to Stop Lamp Switch Replacement .



7. Remove the brake pedal pushrod retaining clip (1), washer (2) and the brake pedal pushrod (3) from the brake pedal (4).

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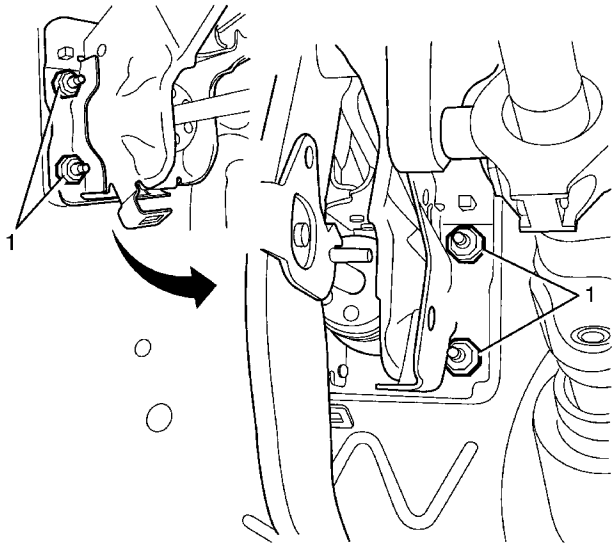
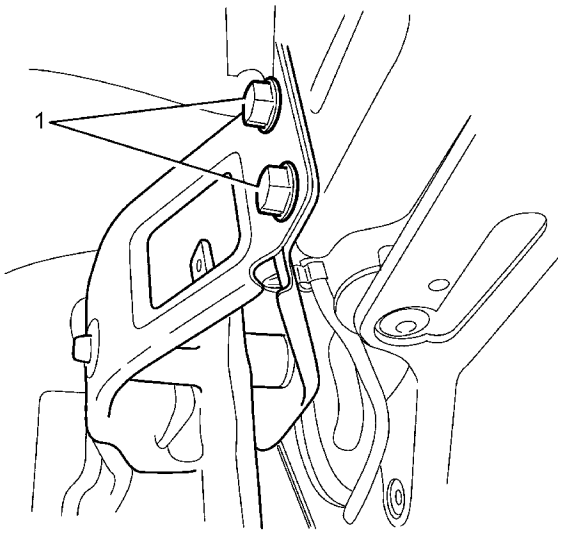


8. Remove the vacuum brake booster to brake pedal support bracket retaining nuts (1).

Important: From the engine compartment, pull the vacuum brake booster forward to release the four studs from the bulkhead and brake pedal support bracket.

9. Remove the vacuum brake booster from the vehicle.



10. Remove the two brake pedal bracket assembly to instrument panel crossmember retaining bolts (1).

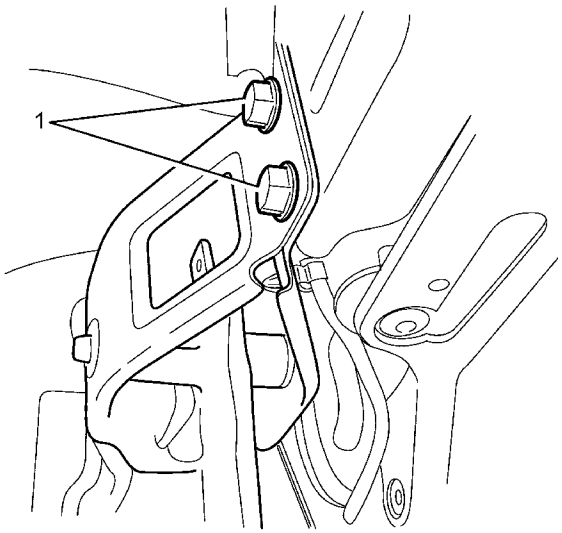
Important: Lower the brake pedal assembly rear end first to aid in removal.

11. Remove the brake pedal assembly from under the instrument panel.

Installation Procedure

Notice: Refer to Adding Fluid to the Brake System Notice in the Preface section.

Notice: Refer to Brake Fluid Effects on Paint and Electrical Components Notice in the Preface section.

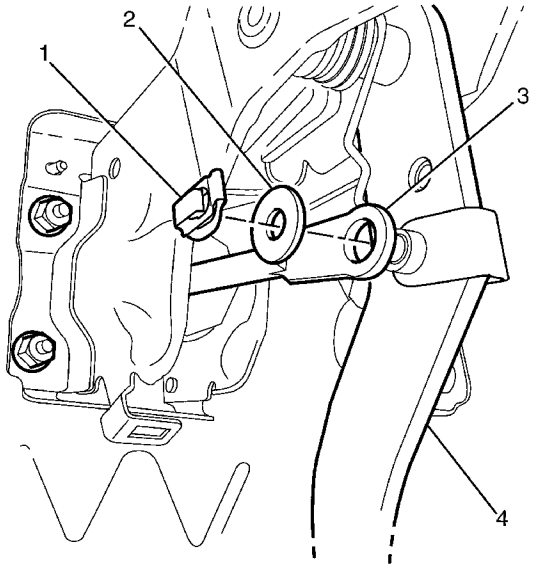


Important: Raise the brake pedal assembly front end first for installation.

1. Install the brake pedal assembly.
2. Install the two brake pedal bracket assembly to instrument panel crossmember retaining bolts (1).

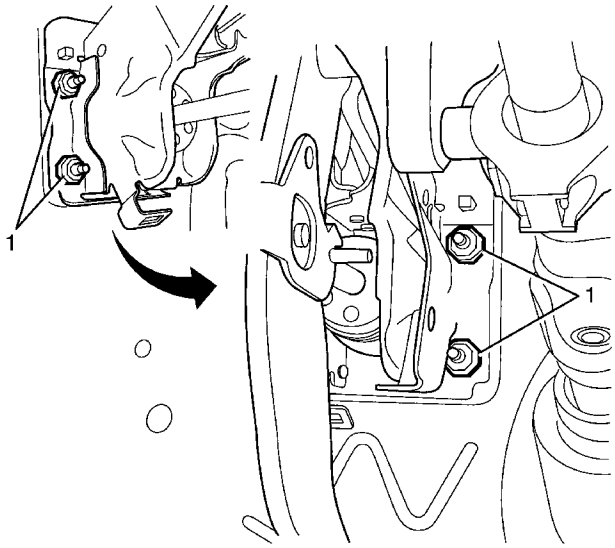
   DO NOT fully tighten at this stage.

3. Have an assistant install the vacuum brake booster from the engine compartment. Make sure the vacuum brake booster's four studs are correctly located in the bulkhead and brake pedal support bracket.



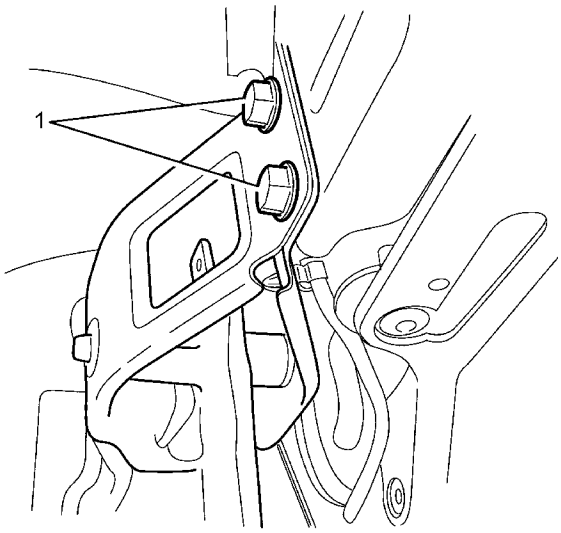
4. Install the push rod (3), washer (2) and retaining clip (1) to the brake pedal assembly (4).

Notice: Refer to Fastener Notice in the Preface section.



5. Install the vacuum brake booster to brake pedal support bracket retaining nuts (1).

Tighten
Tighten the nuts to 22 Nm. (16 lb ft)



6. Tighten the two brake pedal bracket assembly to cross car beam retaining bolts (1).

   Tighten
   Tighten the bolts to 23 Nm. (17 lb ft.)

7. Install the brake pedal position sensor. Refer to Stop Lamp Switch Replacement .
8. Install the vacuum hose and check valve to the vacuum brake booster. Refer to Power Brake Booster Inlet Hose Replacement .
9. Install the master cylinder. Refer to Master Cylinder Replacement .
10. Bleed the braking system. Refer to Hydraulic Brake System Bleeding .
11. Install the instrument panel retainer. Refer to Instrument Panel Retainer Replacement .
12. Install the instrument panel insulator panel. Refer to Instrument Panel Insulator Panel Replacement - Left Side .
13. Install the instrument panel lower trim panel assembly. Refer to Knee Bolster Replacement .
14. Road test the vehicle to inspect correct brake, stop lamp and cruise control operation.

Brake Pipe Replacement

Master Cylinder to BPMV Removal Procedure

Tools Required

J 23738-A Mityvac

Caution: Refer to Safety Glasses Caution in the Preface section.

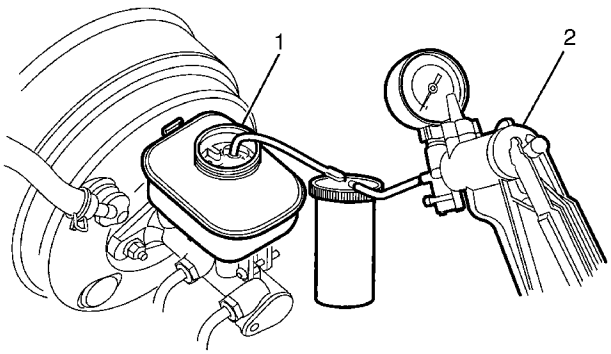
Caution: Refer to Brake Fluid Caution in the Preface section.

Caution: Refer to Brake Fluid Irritant Caution in the Preface section.

Notice: Refer to Adding Fluid to the Brake System Notice in the Preface section.

Notice: Refer to Brake Fluid Effects on Paint and Electrical Components Notice in the Preface section.

1. Remove the engine. Refer to Engine Replacement for 3.6L or Engine Replacement for 6.0L .
2. Remove the sound proofing trim from the bulkhead.
3. Clean the master cylinder, especially around the brake lines and reservoir cap.
4. Place a clean suitable container under the Brake Pressure Modulator Valve (BPMV).
5. Remove the master cylinder reservoir cap.



6. Siphon the brake fluid out of the master cylinder reservoir (1) using a hand vacuum pump (2).

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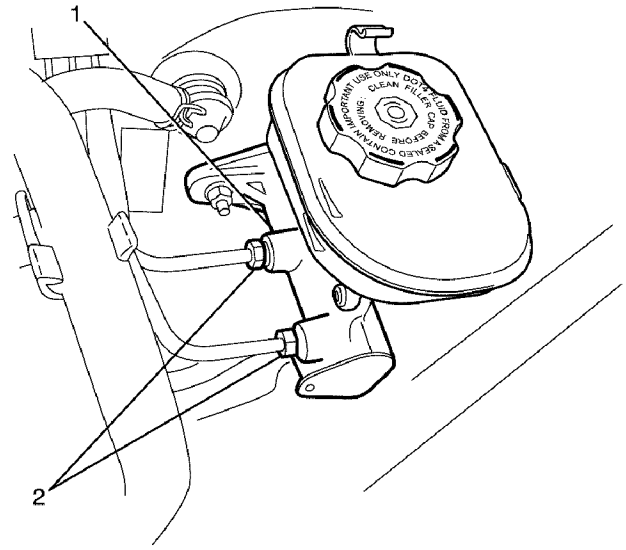
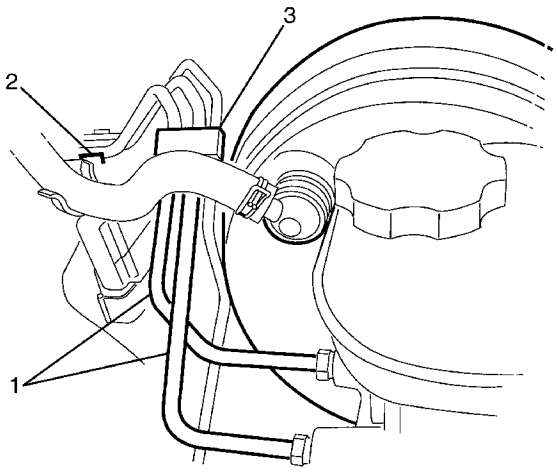
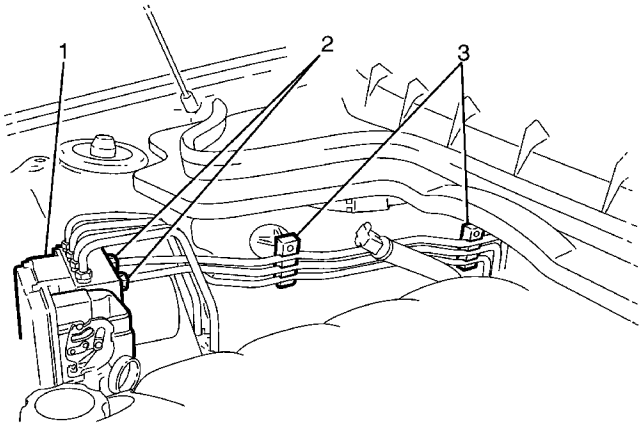


7. Remove the brake pipes (2) from the master cylinder (1).



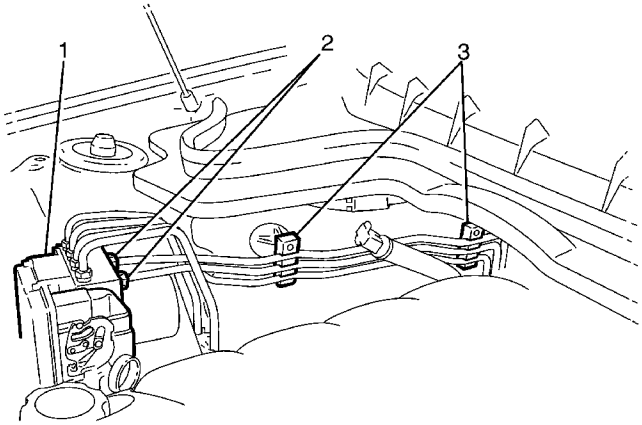
8. Detach the brake pipes (1) from the retaining clips (2 and 3)



Important: Record the location of all brake pipes to the BPMV assembly for use as an aid during installation.

9. Remove the brake pipes (2) from the BPMV (1).
10. Detach the brake pipes (2) from the retaining clips (3).

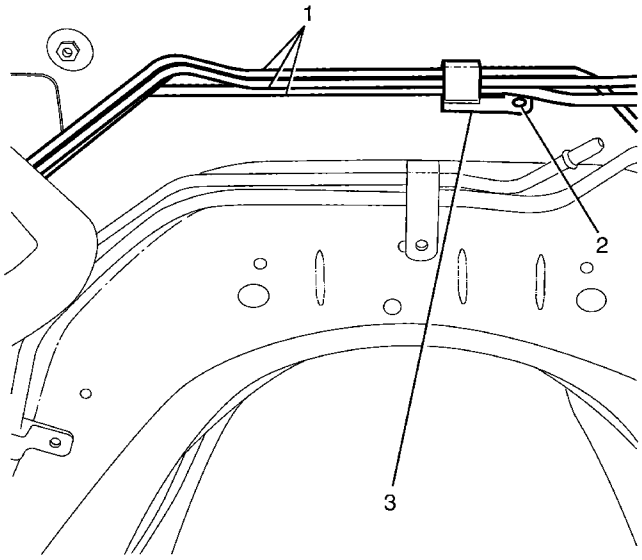
Master Cylinder to BPMV Installation Procedure



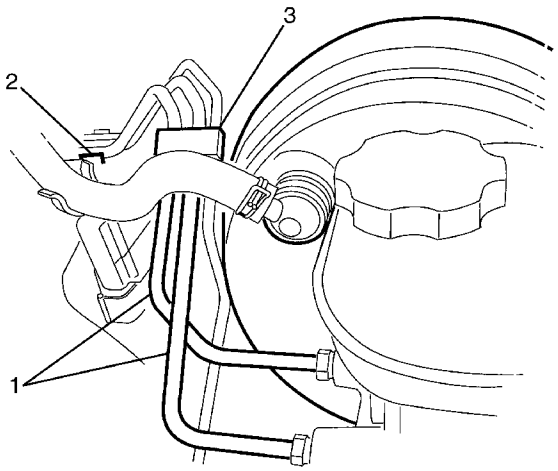
1. Install the brake pipes (2) to the BPMV (1) using the locations recorded during the removal procedure.

Tighten
Tighten the brake pipes to 15 Nm (11 lb ft).

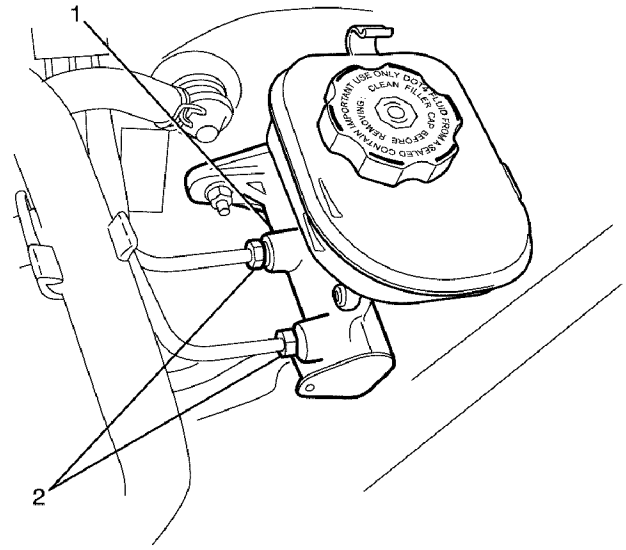
2. Attach the brake pipes (2) from the retaining clips (3).



3. Attach the brake pipe (1) to the locating clip (3).
4. Install the locating clip to bulkhead retaining nut (2).



5. Attach the brake pipes (1) to the retaining clips (2 and 3)



6. Install the brake pipes (2) to the master cylinder (1).

   Tighten
   Tighten the pipe fittings to 15 Nm (11 lb ft).

7. Install the sound proofing trim to the bulkhead.
8. Install the engine. Refer to Engine Replacement for 3.6L or Engine Replacement for 6.0L.
9. Bleed the hydraulic brake system. Refer to Hydraulic Brake System Bleeding .

Front Brake Pipe Removal Procedure - Right

Caution: Refer to Brake Dust Caution in the Preface section.

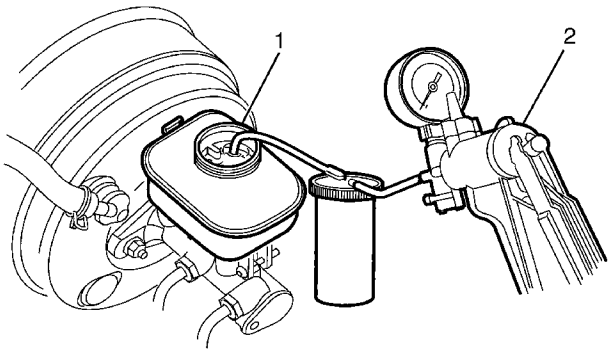
Caution: Refer to Brake Fluid Caution in the Preface section.

Caution: Refer to Brake Fluid Irritant Caution in the Preface section.

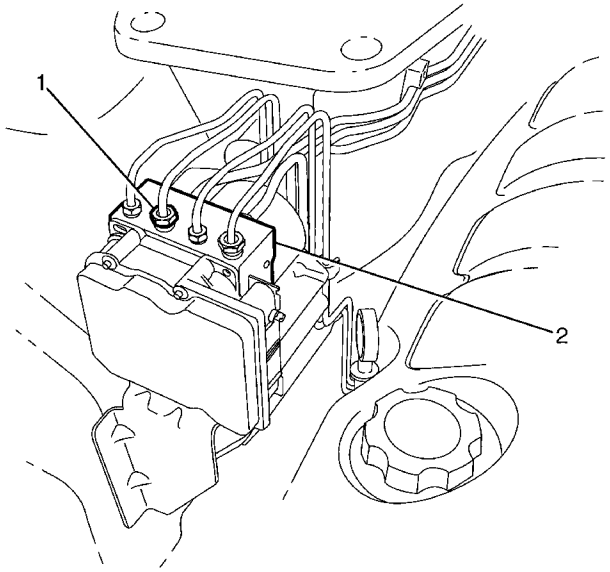
Notice: Refer to Adding Fluid to the Brake System Notice in the Preface section.

Notice: Refer to Brake Fluid Effects on Paint and Electrical Components Notice in the Preface section.

1. Clean the master cylinder, especially around the brake lines and reservoir cap.
2. Place a clean suitable container under the Brake Pressure Modulator Valve (BPMV).
3. Remove the master cylinder reservoir cap.



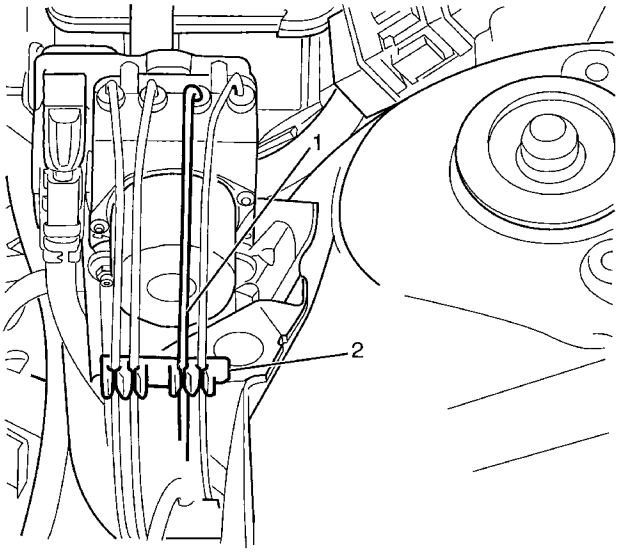
4. Siphon the brake fluid out of the master cylinder reservoir (1) using a hand vacuum pump (2).



5. Disconnect the brake pipe (1) from the BPMV (2).

Important: Install a rubber cap or plug to the BPMV (2) in order to prevent fluid loss and contamination.

6. Plug the BPMV (2).

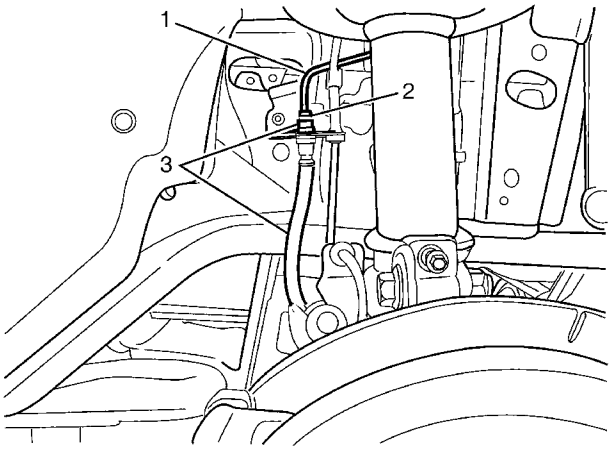


7. Detach the brake pipe (1) from the locating clip (2).

Caution: Refer to Safety Glasses Caution in the Preface section.

Caution: Refer to Vehicle Lifting Caution in the Preface section.

8. Raise and support the vehicle. Refer to Lifting and Jacking the Vehicle .
9. Clean all dirt and foreign material from the brake hose and the brake pipe fittings.



Important: Hold the brake hose (3) with a spanner whilst disconnecting the brake pipe fitting (2) to prevent damage to the brake pipe (1).

10. Disconnect the brake pipe fitting (2) from the brake hose (3).

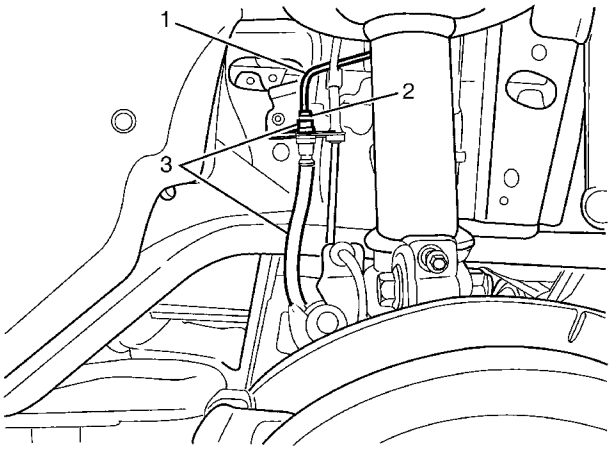
Important: Install a rubber cap or plug to the exposed brake hose fitting end in order to prevent brake fluid loss and contamination.

11. Plug the brake hose (3).
12. Remove the brake pipe (1).

Front Brake Pipe Installation Procedure - Right

Notice: Refer to Adding Fluid to the Brake System Notice in the Preface section.

Notice: Refer to Brake Fluid Effects on Paint and Electrical Components Notice in the Preface section.



1. Install the brake pipe (1).
2. Remove the rubber cap or plug from the brake hose (3).

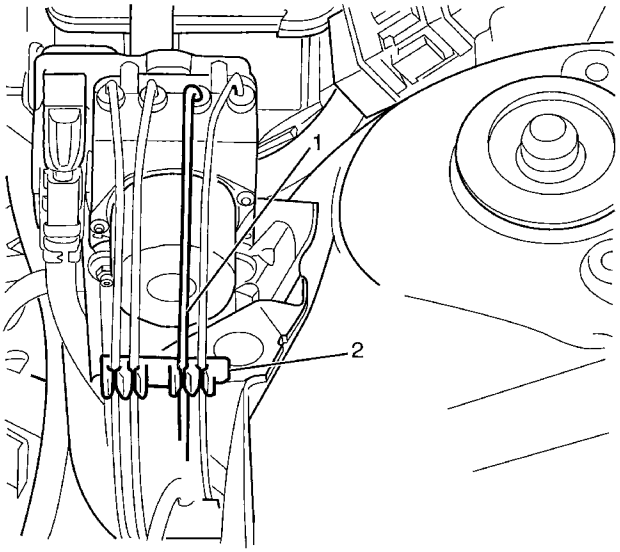
Notice: Refer to Fastener Notice in the Preface section.

Important: Hold the brake hose (3) with a spanner whilst connecting the brake pipe fitting (2) to prevent damage to the brake pipe (1).

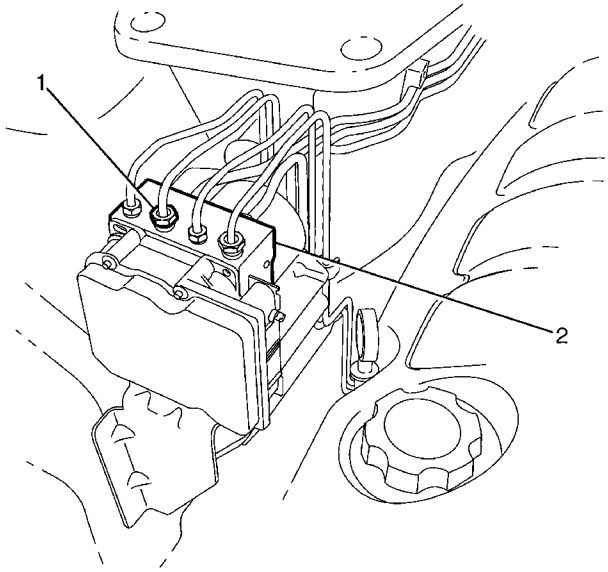
3. Connect the brake pipe fitting (2) to the brake hose (3).

Tighten
Tighten the brake pipe fitting to 15 Nm (11 lb ft).

4. Lower the vehicle.



5. Attach the brake pipe (1) to the locating clip (2).



6. Remove the rubber cap or plug from the BPMV (2).
7. Install the brake pipe (1) to the BPMV (2).

Tighten
Tighten the brake pipe fitting to 15 Nm (11 lb ft).

8. Bleed the hydraulic brake system. Refer to Hydraulic Brake System Bleeding .

Front Brake Pipe Removal Procedure - Left

Caution: Refer to Brake Dust Caution in the Preface section.

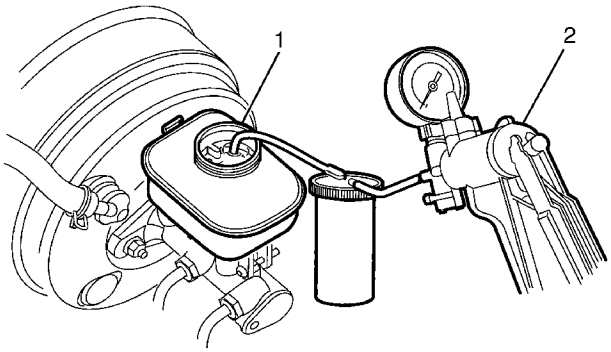
Caution: Refer to Brake Fluid Caution in the Preface section.

Caution: Refer to Brake Fluid Irritant Caution in the Preface section.

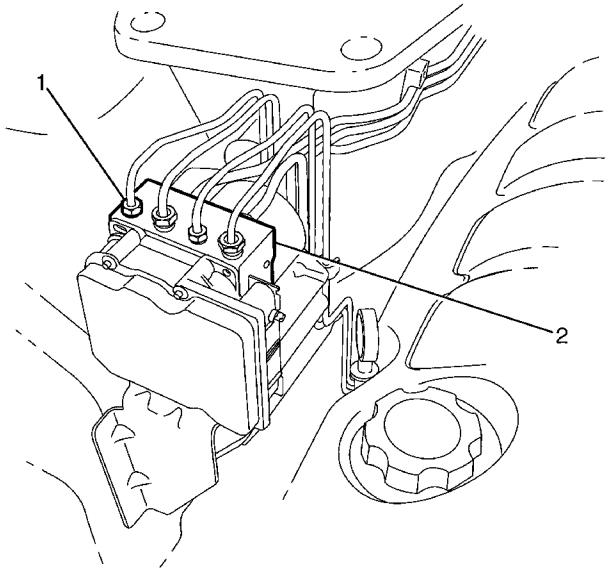
Notice: Refer to Adding Fluid to the Brake System Notice in the Preface section.

Notice: Refer to Brake Fluid Effects on Paint and Electrical Components Notice in the Preface section.

1. Clean the master cylinder, brake lines and reservoir cap.
2. Place a clean suitable container under the Brake Pressure Modulator Valve (BPMV).
3. Remove the master cylinder reservoir cap.



4. Siphon the brake fluid out of the master cylinder reservoir (1) using a hand vacuum pump (2).



5. Disconnect the brake pipe (1) from the BPMV (2).

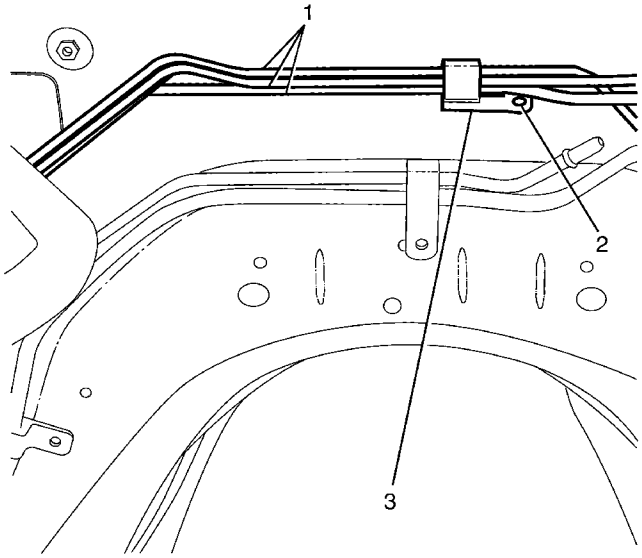
Important: Install a rubber cap or plug to the BPMV (2) in order to prevent fluid loss and contamination.

6. Plug the BPMV (2).

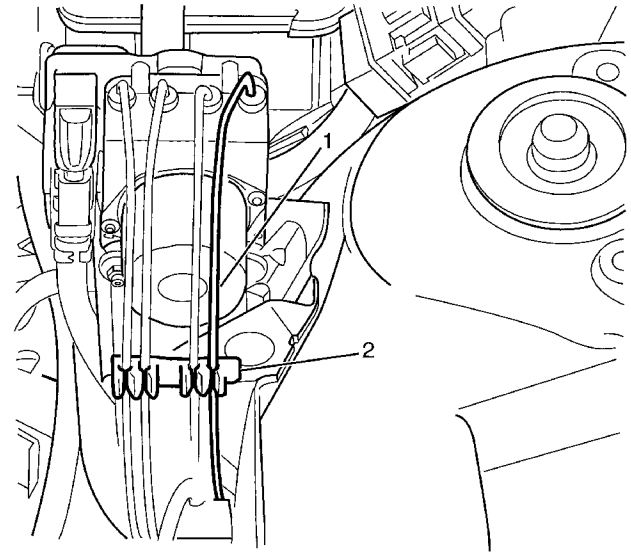
Caution: Refer to Safety Glasses Caution in the Preface section.

Caution: Refer to Vehicle Lifting Caution in the Preface section.

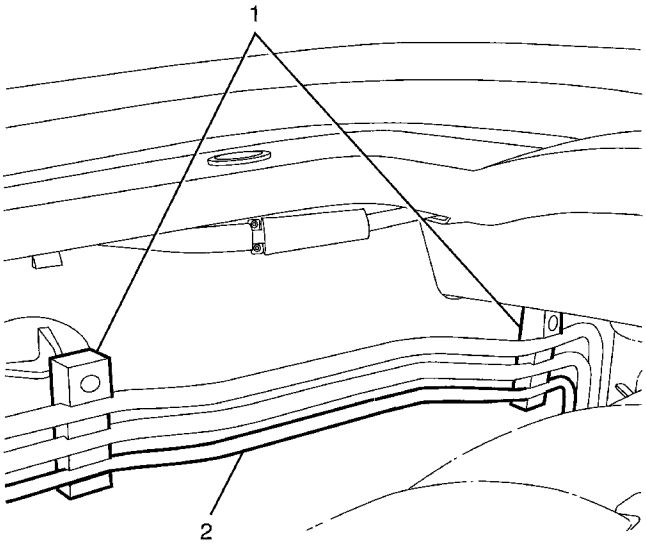
7. Raise and support the vehicle. Refer to Lifting and Jacking the Vehicle .
8. Remove the engine. Refer to Engine Replacement for 3.6L or Engine Replacement for 6.0L .
9. Remove the sound proofing trim from the bulkhead.



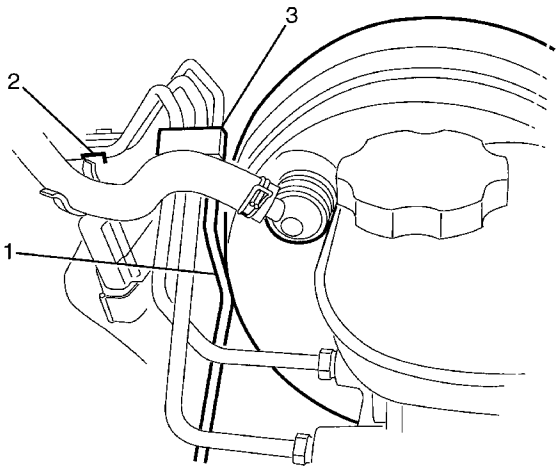
10. Remove the locating clip to bulkhead retaining nut (2).
11. Detach the brake pipe (1) from the locating clip (3).



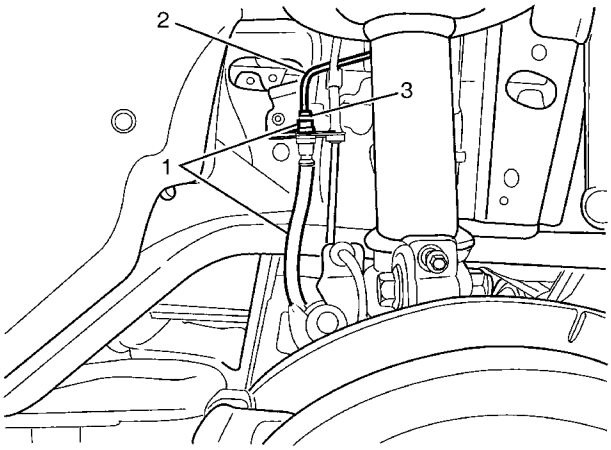
12. Detach the brake pipe (1) from the locating clip (2).



13. Detach the brake pipe (2) from the locating clips (1).



14. Detach the brake pipe (1) from the locating clips (2).
15. Clean all dirt and foreign material from the brake hose and the brake pipe fittings.



Important: Hold the brake hose (1) with a spanner whilst disconnecting the brake pipe fitting (3) to prevent damage to the brake pipe (2).

16. Disconnect the brake pipe fitting (3) from the brake hose (1).

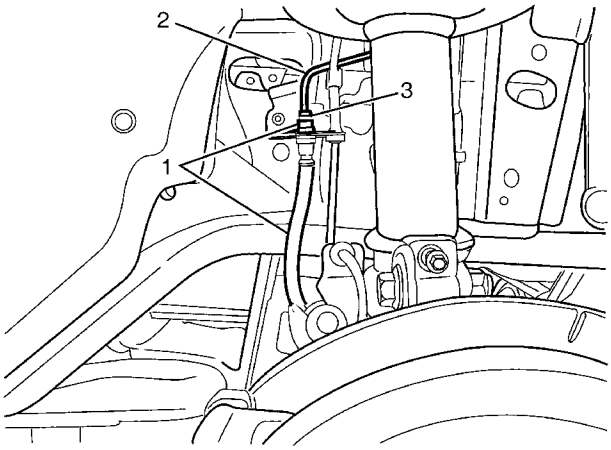
Important: Install a rubber cap or plug to the exposed brake hose (1) in order to prevent brake fluid loss and contamination.

17. Plug the brake hose (1).
18. Remove the brake pipe (2).

Front Brake Pipe Installation Procedure - Left

Notice: Refer to Adding Fluid to the Brake System Notice in the Preface section.

Notice: Refer to Brake Fluid Effects on Paint and Electrical Components Notice in the Preface section.



1. Install the brake pipe (2).
2. Remove the rubber cap or plug from the brake hose (1).

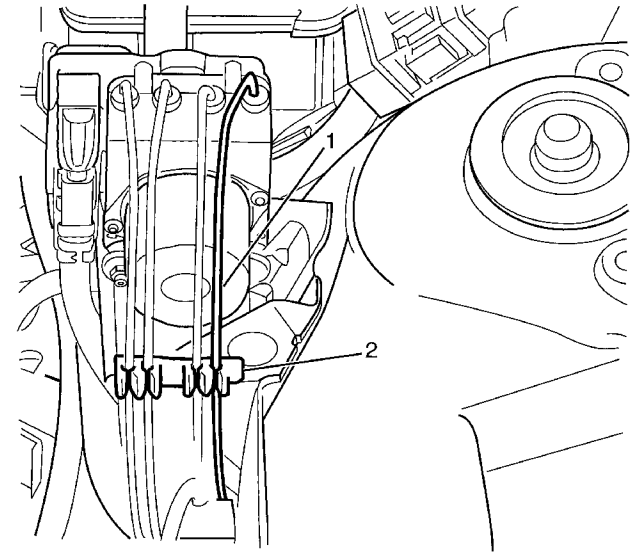
Notice: Refer to Fastener Notice in the Preface section.

Important: Hold the brake hose (1) with a spanner whilst disconnecting the brake pipe fitting (3) to prevent damage to the brake pipe (2).

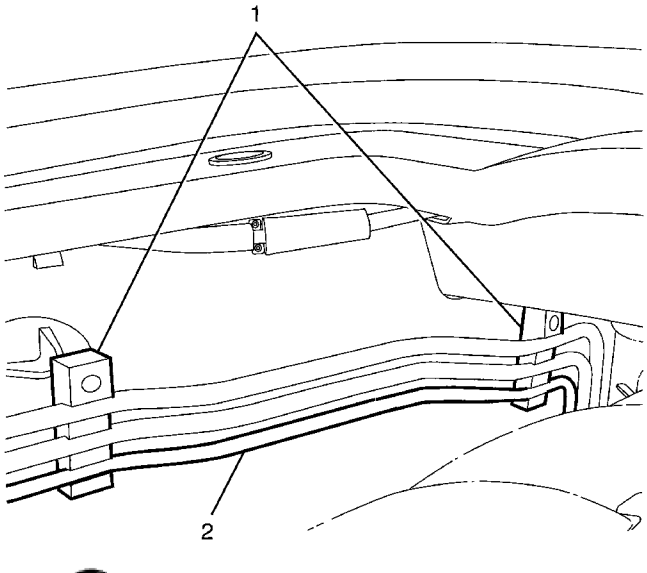
3. Connect the brake pipe (2) to the brake hose (1).

Tighten
Tighten the brake pipe fitting to 15 Nm (11 lb ft).

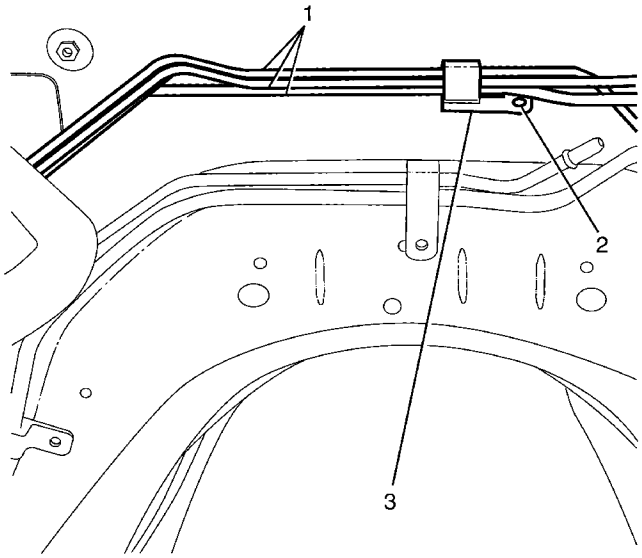
4. Lower the vehicle.



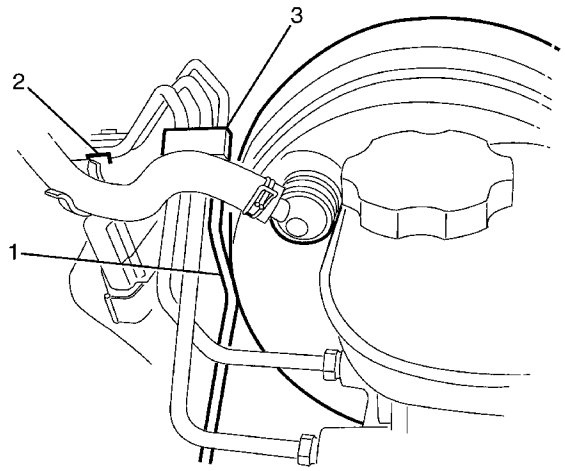
5. Attach the brake pipe (1) to the locating clip (2).



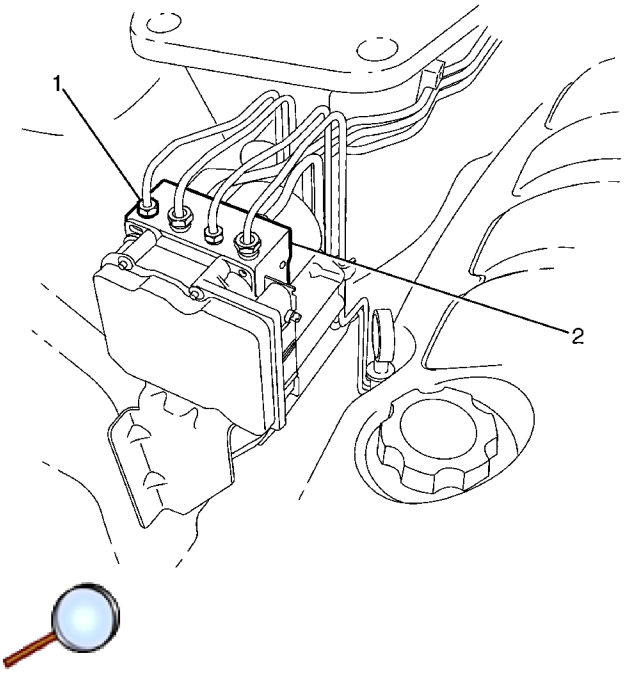
6. Attach the brake pipe (1) to the locating clip (2).



7. Attach the brake pipe (1) to the locating clip (3).
8. Install the locating clip to bulkhead retaining nut (2).



9. Attach the brake pipe (1) to the locating clips (2).



10. Remove the rubber cap or plug from the BPMV (2).
11. Install the brake pipe (1) to the BPMV (2).

Tighten
Tighten the brake pipe fitting to 15 Nm (11 lb ft).

12. Install the sound proofing trim to the bulkhead.
13. Install the engine. Refer to Engine Replacement for 3.6L or Engine Replacement for 6.0L .
14. Bleed the hydraulic brake system. Refer to Hydraulic Brake System Bleeding .

Intermediate Brake Pipe Removal Procedure

Caution: Refer to Brake Dust Caution in the Preface section.

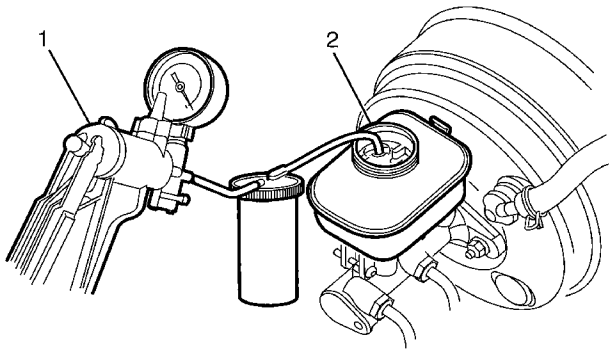
Caution: Refer to Brake Fluid Caution in the Preface section.

Caution: Refer to Brake Fluid Irritant Caution in the Preface section.

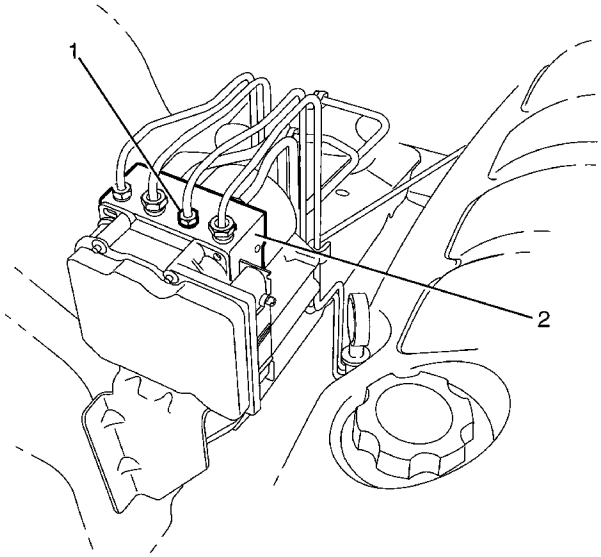
Notice: Refer to Adding Fluid to the Brake System Notice in the Preface section.

Notice: Refer to Brake Fluid Effects on Paint and Electrical Components Notice in the Preface section.

1. Clean the master cylinder, brake lines and reservoir cap.
2. Place a clean suitable container under the Brake Pressure Modulator Valve (BPMV).
3. Remove the master cylinder reservoir cap.



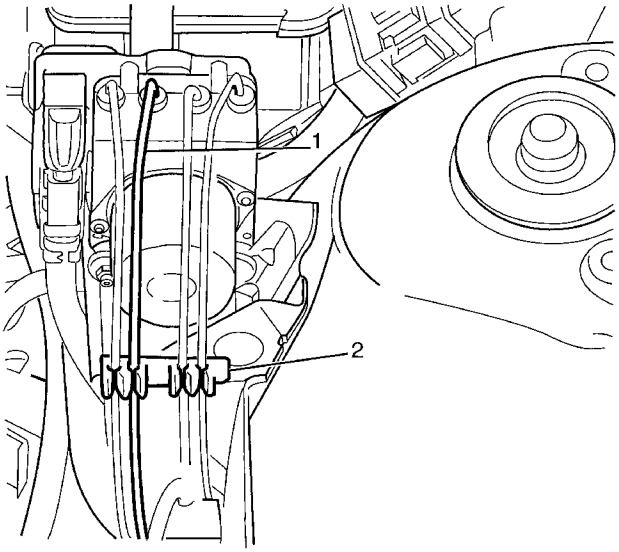
4. Siphon the brake fluid out of the master cylinder reservoir (2) using a hand vacuum pump (1).



5. Disconnect the brake pipe (1) from the BPMV (2).

Important: Install a rubber cap or plug to the BPMV (2) in order to prevent fluid loss and contamination.

6. Plug the BPMV (2).

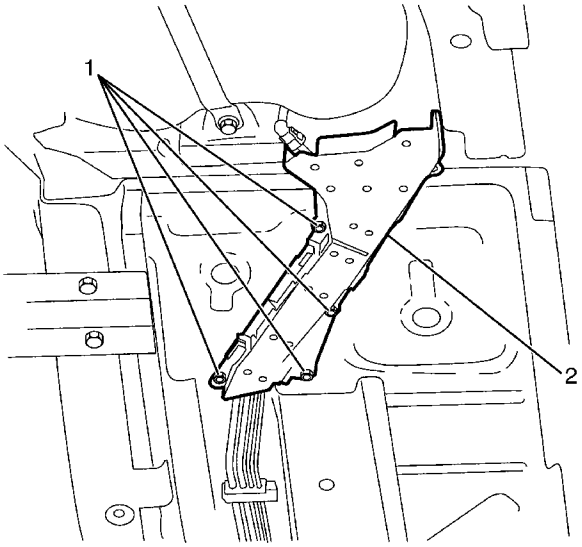


7. Detach the brake pipe (1) to the locating clip (2).

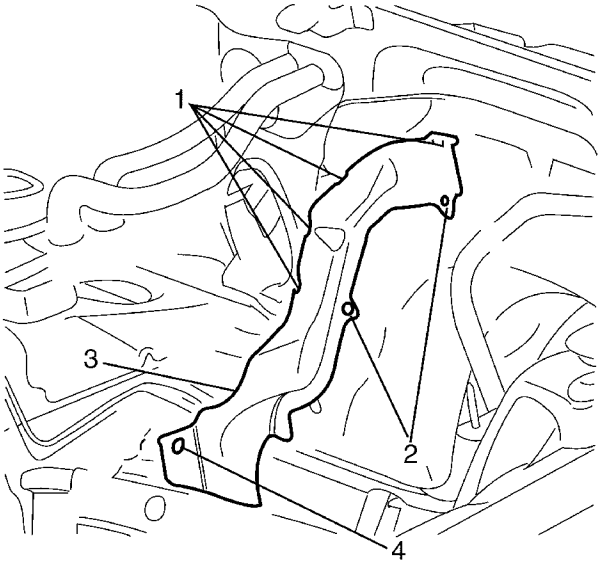
Caution: Refer to Safety Glasses Caution in the Preface section.

Caution: Refer to Vehicle Lifting Caution in the Preface section.

8. Raise and support the vehicle. Refer to Lifting and Jacking the Vehicle .

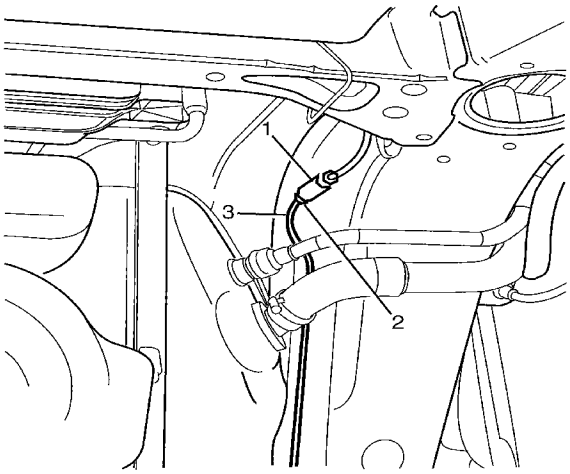


9. Remove the brake and fuel pipe splash shield to chassis retaining nuts (1).
10. Remove the brake and fuel pipe splash shield (2).
11. Remove the front heat shield. Refer to Exhaust Front Heat Shield Replacement .
12. Remove the engine. Refer to Engine Replacement for 3.6L or Engine Replacement for 6.0L .



Important: The brake and fuel pipe protector shield (4) is retained by rivets (3). These rivets (2) must be drilled out during removal and replaced as per the installation procedure.

13. Remove the brake and fuel pipe protector shield to bulkhead retaining rivets (2).
14. Remove the brake and fuel pipe protector shield to bulkhead retaining bolt (3).
15. Detach the brake and fuel pipe protector shield clips (1).
16. Remove the brake and fuel pipe protector shield (2).
17. Remove the rear subframe. Refer to Rear Frame Replacement .

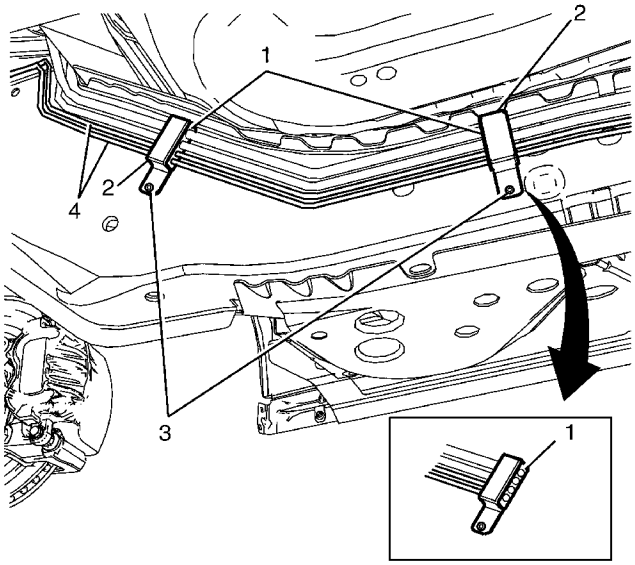


Important: Hold the brake pipe union (1) with a spanner whilst disconnecting the brake pipe fitting (2) to prevent damage to the intermediate brake pipe (3).

18. Disconnect the intermediate brake pipe (3) from the brake pipe union (1).

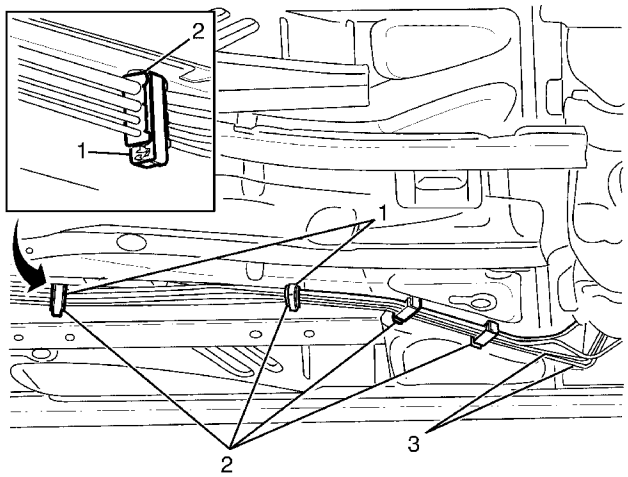
Important: Install a rubber cap or plug to the brake pipe union (1) in order to prevent brake fluid loss and/or contamination.

19. Plug the brake pipe union (1).



Important: The brake and fuel pipe retaining brackets (2) are retained by rivets (3). These rivets (3) must be drilled out during removal and replaced as per the installation procedure.

20. Remove the brake and fuel pipe retaining bracket to chassis retaining rivets (3).
21. Remove the brake and fuel pipe retaining brackets (2).
22. Remove the brake pipe (4) from the brake and fuel pipe retaining bracket rubber insulators (1).



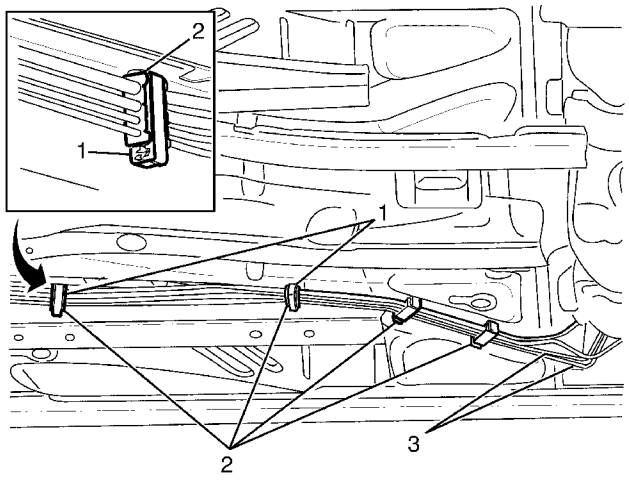
Important: Use a small flat blade tool to open the brake and fuel pipe retaining brackets (2) by detaching the brake and fuel pipe retaining bracket (2) clip.

23. Open the brake and fuel pipe retaining brackets (2).
24. Remove the brake pipe (1) from the brake and fuel pipe retaining bracket rubber insulators (3).

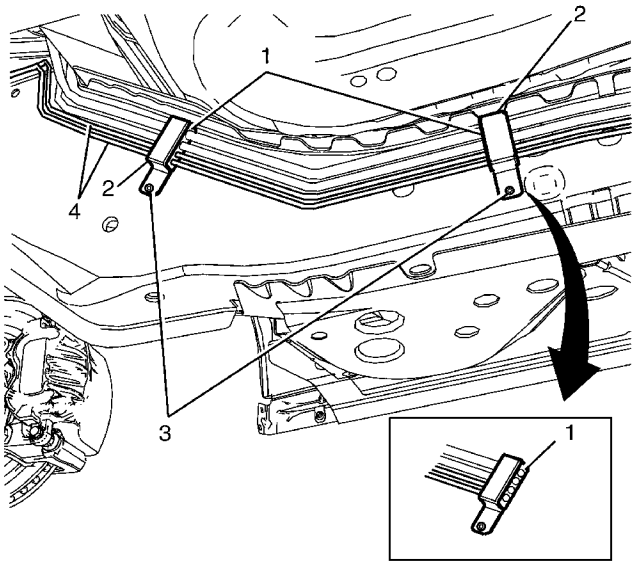
Intermediate Brake Pipe Installation Procedure

Notice: Refer to Adding Fluid to the Brake System Notice in the Preface section.

Notice: Refer to Brake Fluid Effects on Paint and Electrical Components Notice in the Preface section.

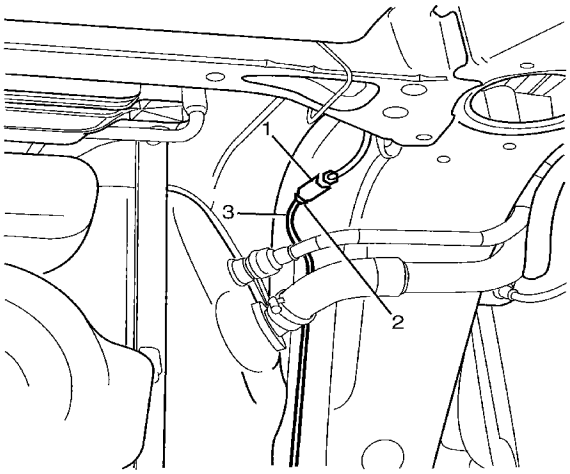


1. Install the brake pipe (1) to the brake and fuel pipe retaining bracket rubber insulators (3).
2. Close the brake and fuel pipe retaining brackets (2).



3. Install the brake pipe (4) to the two brake and fuel pipe retaining bracket rubber insulators (1).
4. Install the two brake and fuel pipe retaining brackets (2).
5. Install the two brake and fuel pipe retaining bracket to chassis retaining rivets (3).
6. Remove the rubber cap or plug from the brake pipe union.

Notice: Refer to Fastener Notice in the Preface section.

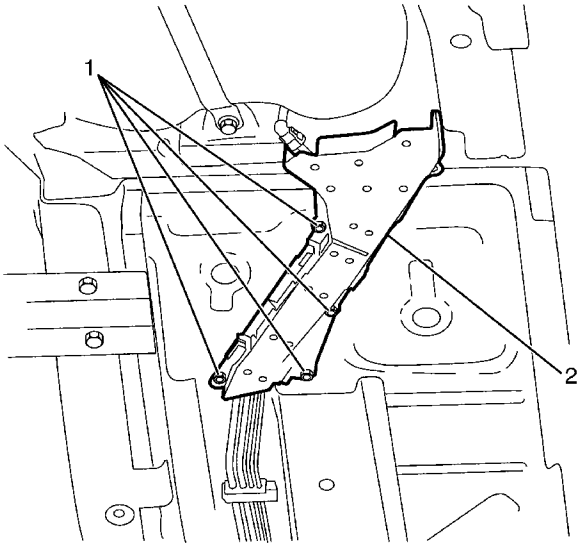


Important: Hold the brake pipe union (1) with a spanner whilst connecting the brake pipe fitting (2) to prevent damage to the brake pipe (3).

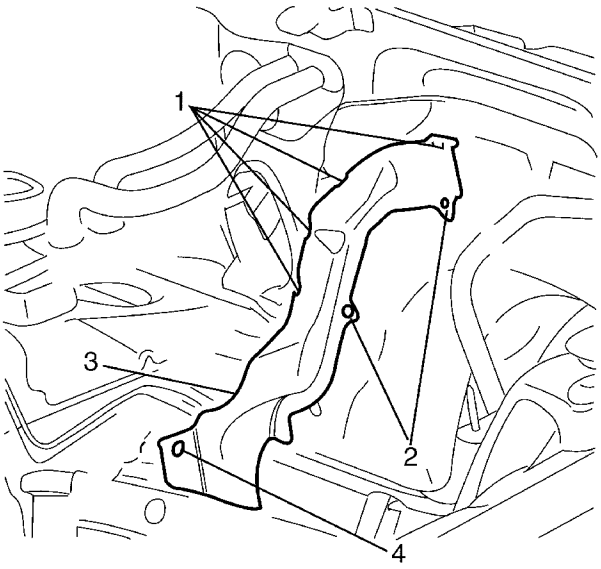
7. Connect the brake pipe (1) to the brake pipe union (2).

   Tighten
   Tighten the brake pipe fitting to 16 N·m (12 lb ft).

8. Install the rear subframe. Refer to Rear Frame Replacement .

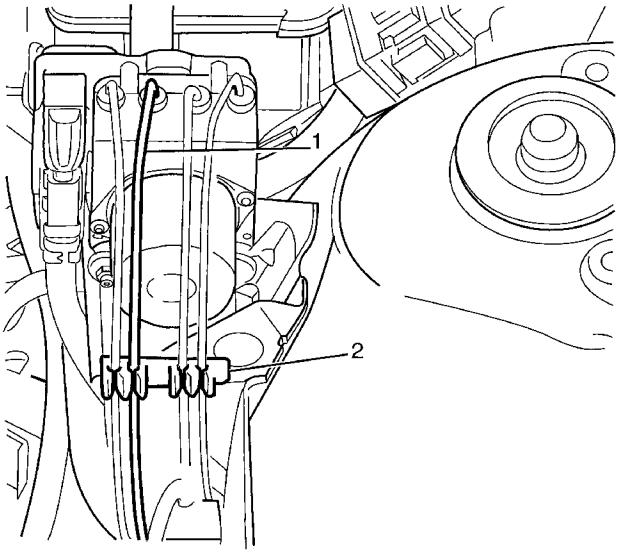


9. Install the brake and fuel pipe splash shield (2) to the underbody.
10. Install the brake and fuel pipe splash shield to chassis retaining nuts (1).
11. Install the engine. Refer to Engine Replacement for 3.6L or Engine Replacement for 6.0L .
12. Install the front heat shield. Refer to Exhaust Front Heat Shield Replacement .
13. Lower the vehicle.

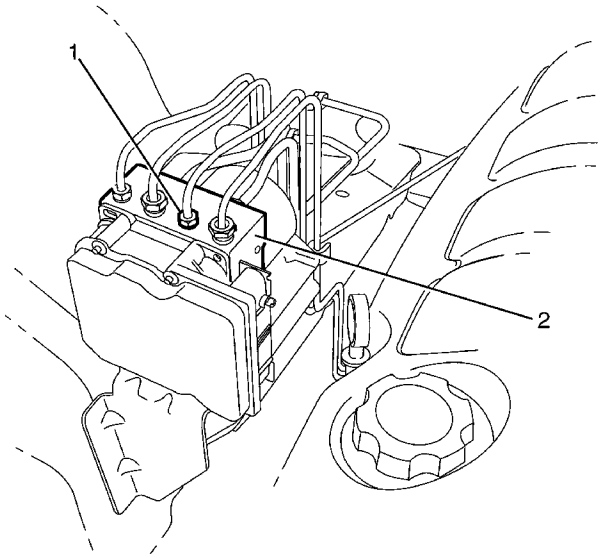


14. Install the brake and fuel pipe protector shield (4)
15. Attach the brake and fuel pipe protector shield clips (1).

16. Install NEW brake and fuel pipe protector shield to bulkhead retaining rivets (2).
17. Install the brake and fuel pipe protector shield to bulkhead retaining bolt (3).



18. Attach the brake pipe (1) to the locating clip (2).



19. Remove the rubber cap or plug from the BPMV (2).
20. Install the brake pipe (1) to the BPMV (2).

Tighten
Tighten the brake pipe fitting to 16 N·m (12 lb ft).

21. Bleed the hydraulic brake system. Refer to Hydraulic Brake System Bleeding .

Rear Brake Pipe Removal Procedure - Right

Caution: Refer to Brake Dust Caution in the Preface section.

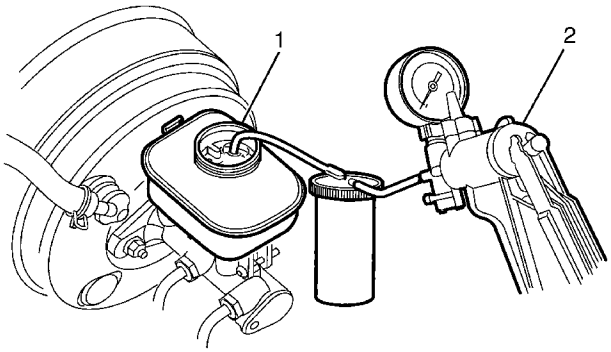
Caution: Refer to Brake Fluid Caution in the Preface section.

Caution: Refer to Brake Fluid Irritant Caution in the Preface section.

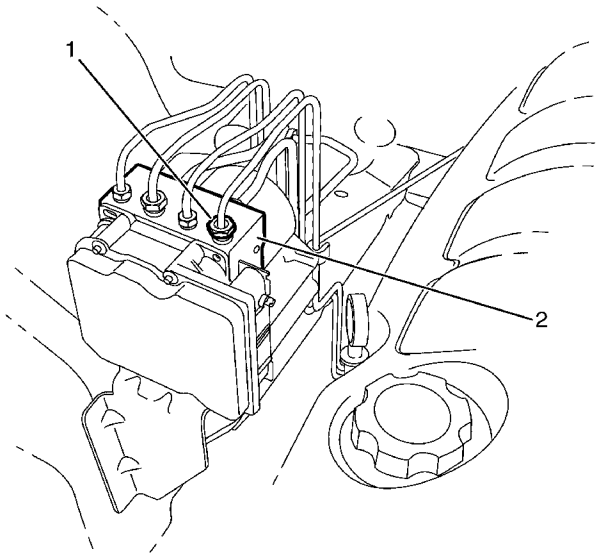
Notice: Refer to Adding Fluid to the Brake System Notice in the Preface section.

Notice: Refer to Brake Fluid Effects on Paint and Electrical Components Notice in the Preface section.

1. Clean the master cylinder, brake lines and reservoir cap.
2. Remove the master cylinder reservoir cap.



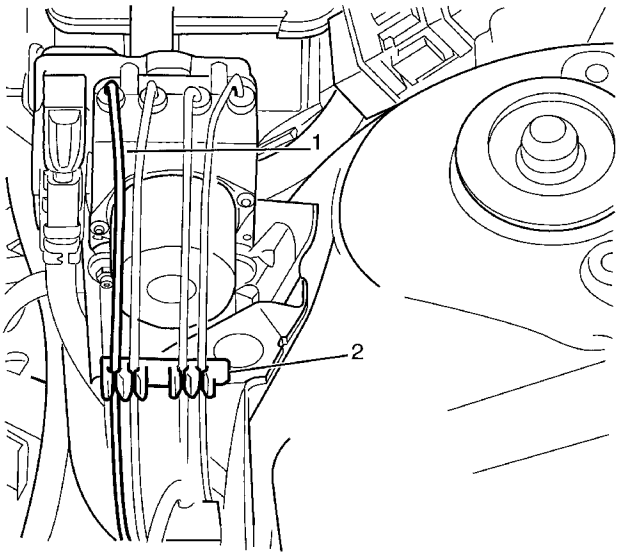
3. Siphon the brake fluid out of the master cylinder reservoir (1) using a hand vacuum pump (2).



4. Disconnect the brake pipe (1) from the BPMV (2).

   Important: Install a rubber cap or plug to the BPMV (2) in order to prevent fluid loss and contamination.

5. Plug the BPMV (2).

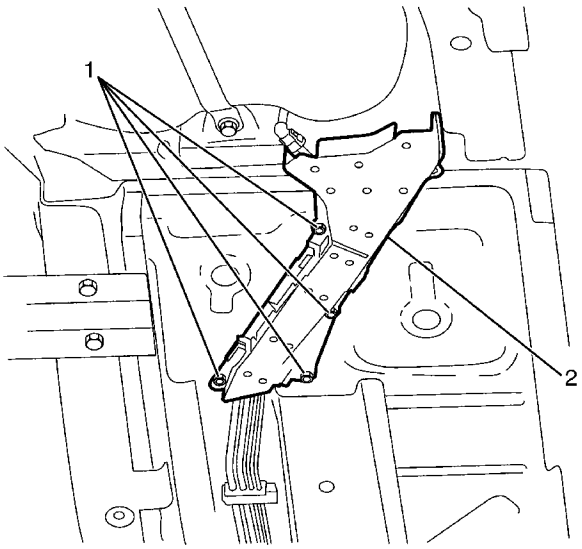


6. Detach the brake pipe (1) from the locating clip (2).

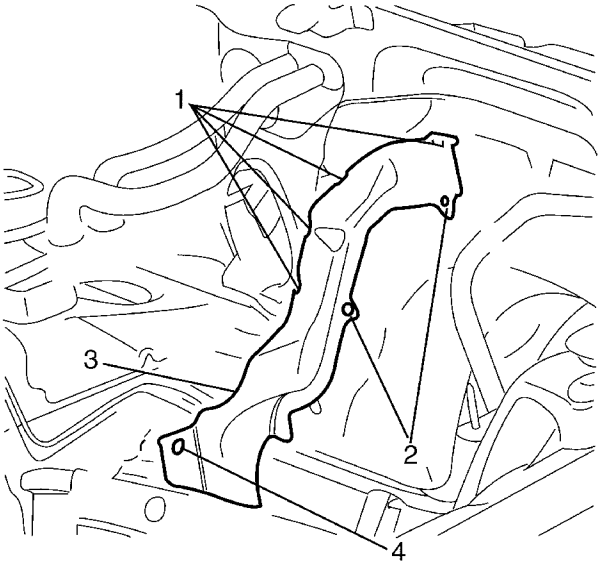
   Caution: Refer to Safety Glasses Caution in the Preface section.

   Caution: Refer to Vehicle Lifting Caution in the Preface section.

7. Raise and support the vehicle. Refer to Lifting and Jacking the Vehicle .

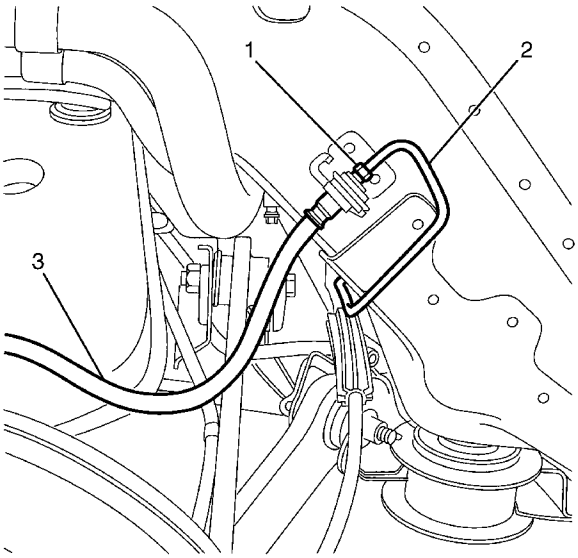


8. Remove the brake and fuel pipe splash shield to chassis retaining nuts (1).
9. Remove the brake and fuel pipe splash shield (2).
10. Remove the front heat shield. Refer to Exhaust Front Heat Shield Replacement t.
11. Remove the engine. Refer to Engine Replacement for 3.6L or Engine Replacement for 6.0L .



Important: The brake and fuel pipe protector shield (4) is retained by rivets (3). These rivets (2) must be drilled out during removal and replaced as per the installation procedure.

12. Remove the brake and fuel pipe protector shield to bulkhead retaining rivets (2).
13. Remove the brake and fuel pipe protector shield to bulkhead retaining bolt (3).
14. Detach the brake and fuel pipe protector shield clips (1).
15. Remove the brake and fuel pipe protector shield (2).

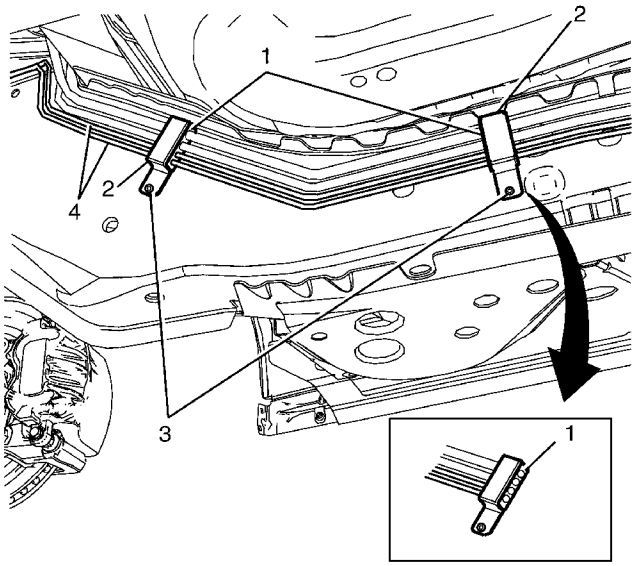


Important: Hold the brake hose (3) with a spanner whilst disconnecting the brake pipe fitting (1) to prevent damage to the brake pipe (2).

16. Disconnect the brake pipe fitting (1) from the brake hose (3).

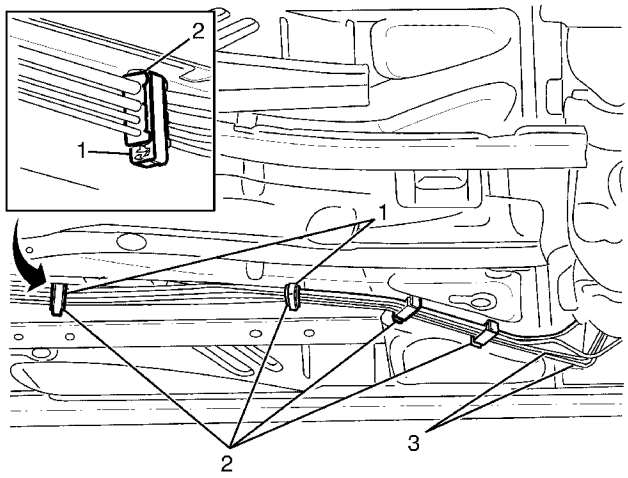
Important: Install a rubber cap or plug to the brake hose (3) in order to prevent brake fluid loss and contamination.

17. Plug the brake hose (3).
18. Remove the brake pipe (2).



Important: The brake and fuel pipe retaining brackets (2) are retained by rivets (3). These rivets (3) must be drilled out during removal and replaced as per the installation procedure.

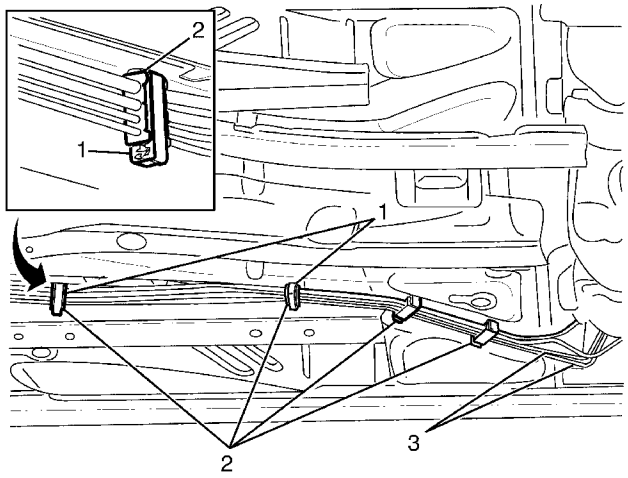
19. Remove the brake and fuel pipe retaining bracket to chassis retaining rivets (3).
20. Remove the brake and fuel pipe retaining brackets (2).
21. Remove the brake pipe (4) from the brake and fuel pipe retaining bracket rubber insulators (1).



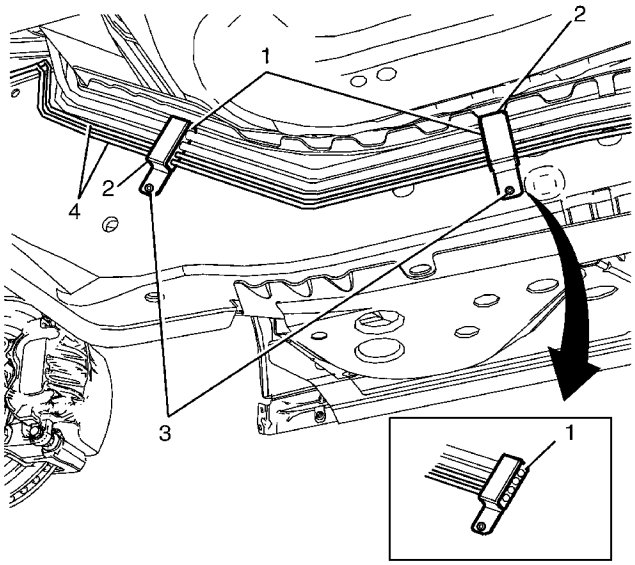
Important: Use a small flat blade tool to open the brake and fuel pipe retaining brackets (1) by detaching the brake and fuel pipe retaining bracket (1) clip.

22. Open the brake and fuel pipe retaining brackets (1).
23. Remove the brake pipes (3) from the brake and fuel pipe retaining bracket rubber insulators (2).

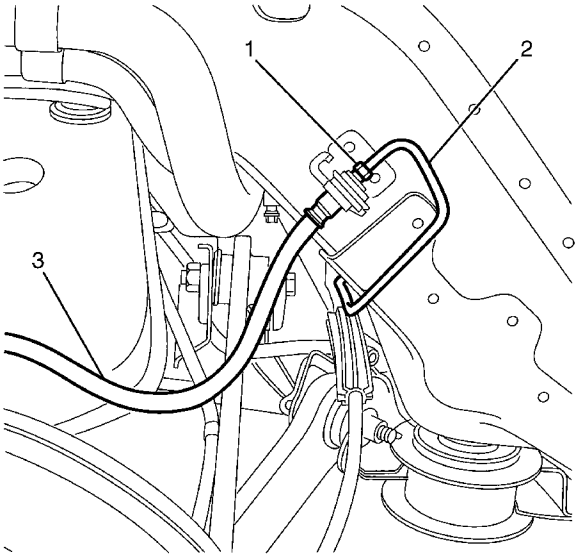
Rear Brake Pipe Installation Procedure - Right



1. Install the brake pipes (3) to the brake and fuel pipe retaining bracket rubber insulators (2).
2. Close the brake and fuel pipe retaining brackets (1).



3. Install the brake pipes (4) to the two brake and fuel pipe retaining bracket rubber insulators (1).
4. Install the two brake and fuel pipe retaining brackets (2).
5. Install the two brake and fuel pipe retaining bracket to chassis retaining rivets (3).



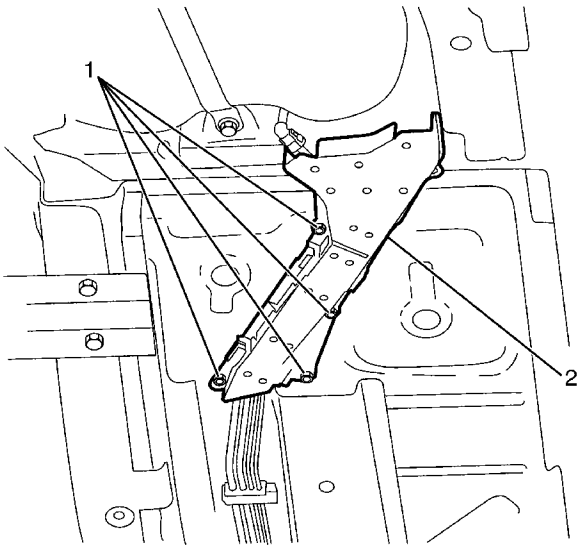
6. Remove the rubber cap or plug from the brake hose (3).

Notice: Refer to Fastener Notice in the Preface section.

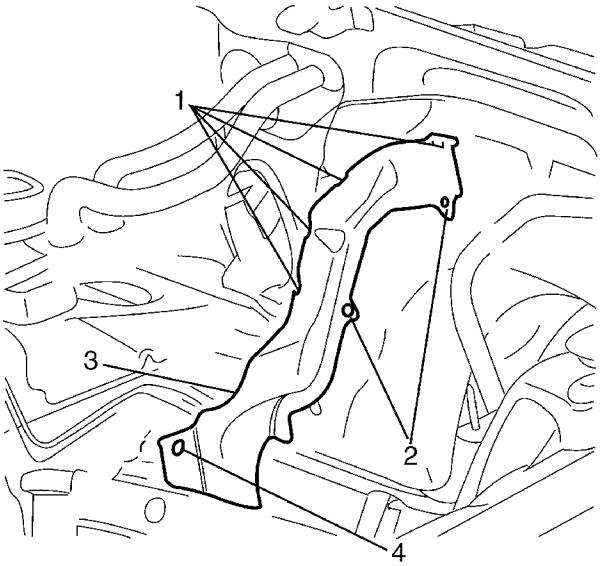
Important: Hold the brake hose (3) with a spanner whilst connecting the brake pipe fitting (1) to prevent damage to the brake pipe (2).

7. Connect the brake pipe fitting (1) to the brake hose (3).

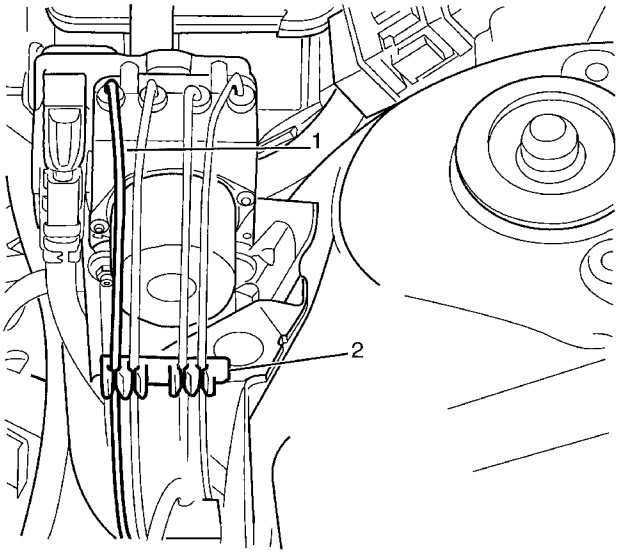
Tighten
Tighten the brake pipe fitting to 15 Nm (11 lb ft).



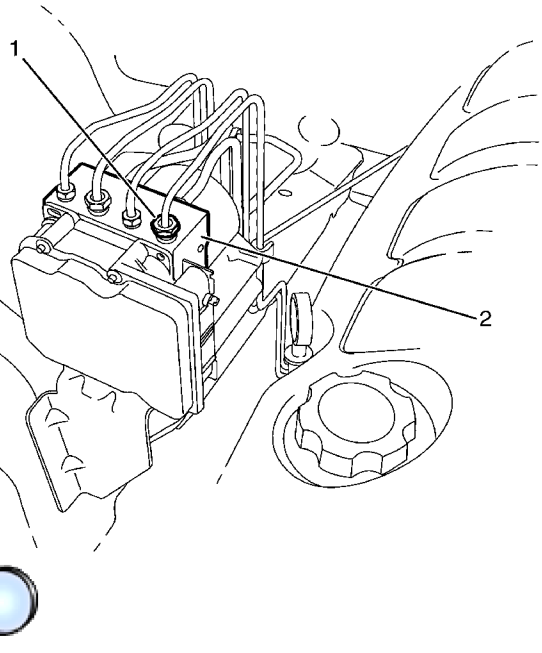
8. Install the brake and fuel pipe splash shield (2) to the underbody.
9. Install the brake and fuel pipe splash shield to chassis retaining nuts (1).
10. Install the engine. Refer to Engine Replacement for 3.6L or Engine Replacement for 6.0L .
11. Install the front heat shield. Refer to Exhaust Front Heat Shield Replacement .
12. Lower the vehicle.



13. Install the brake and fuel pipe protector shield (4)
14. Attach the brake and fuel pipe protector shield clips (1).
15. Install NEW brake and fuel pipe protector shield to bulkhead retaining rivets (2).
16. Install the brake and fuel pipe protector shield to bulkhead retaining bolt (3).



17. Attach the brake pipe (1) to the locating clip (2).



18. Remove the rubber cap or plug from the BPMV (2).
19. Install the brake pipe (1) to the BPMV (2).

Tighten
Tighten the brake pipe fitting to 15 Nm (11 lb ft).

20. Bleed the hydraulic brake system. Refer to Hydraulic Brake System Bleeding .

Rear Brake Pipe Removal Procedure - Left

Caution: Refer to Brake Dust Caution in the Preface section.

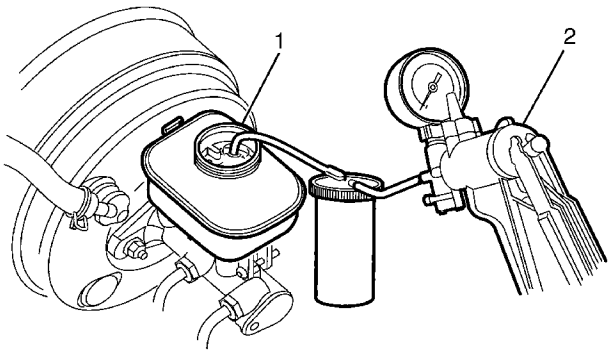
Caution: Refer to Brake Fluid Caution in the Preface section.

Caution: Refer to Brake Fluid Irritant Caution in the Preface section.

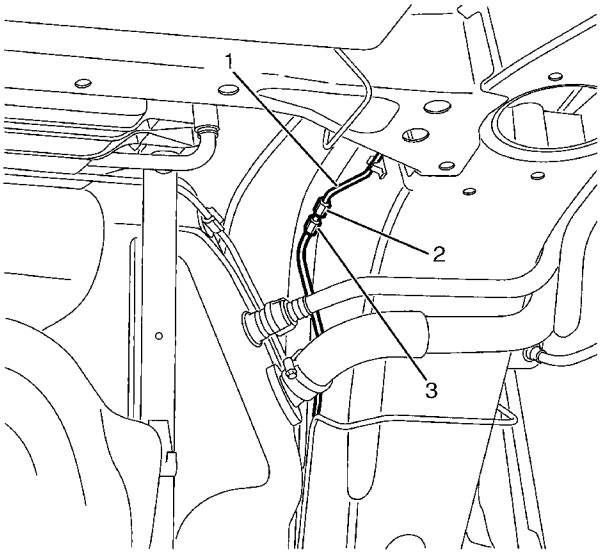
Notice: Refer to Adding Fluid to the Brake System Notice in the Preface section.

Notice: Refer to Brake Fluid Effects on Paint and Electrical Components Notice in the Preface section.

1. Clean the master cylinder, brake lines and reservoir cap.
2. Remove the master cylinder reservoir cap.



3. Siphon the brake fluid out of the master cylinder reservoir (1) using a hand vacuum pump (2).
4. Remove the rear suspension sub frame assembly. Refer to Rear Frame Replacement .

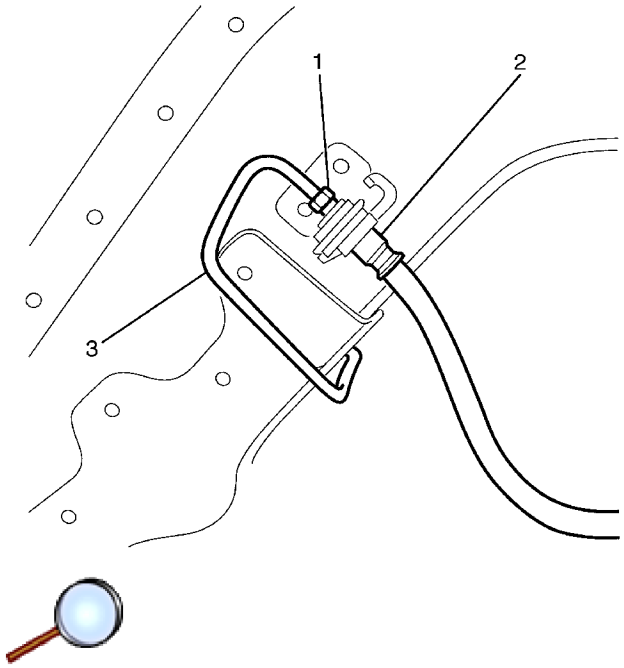


Important: Hold the brake pipe union (3) with a spanner whilst disconnecting the brake pipe fitting (2) to prevent damage to the brake pipe (1).

5. Disconnect the intermediate brake pipe (1) from the brake pipe union (3).

Important: Install a rubber cap or plug to the brake pipe union (3) in order to prevent brake fluid loss and/or contamination.

6. Plug the brake pipe union (3).

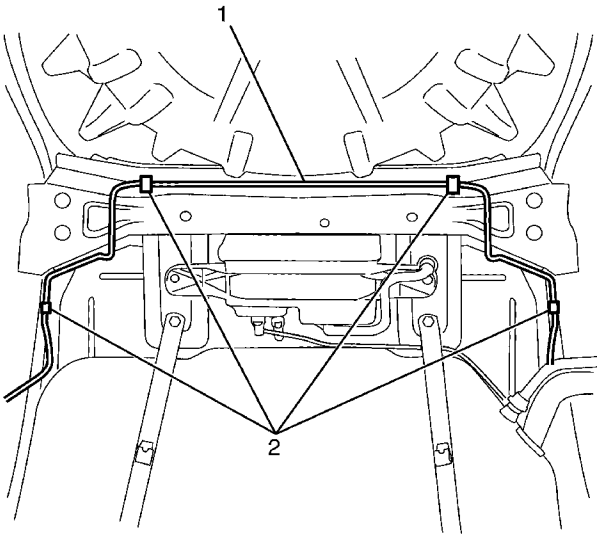


Important: Hold the brake hose (2) with a spanner whilst disconnecting the brake pipe fitting (1) to prevent damage to the brake pipe (3).

7. Disconnect the brake pipe fitting (1) from the brake hose (2).

Important: Install a rubber cap or plug to the brake hose fitting end in order to prevent brake fluid loss and contamination.

8. Plug the brake hose (2).

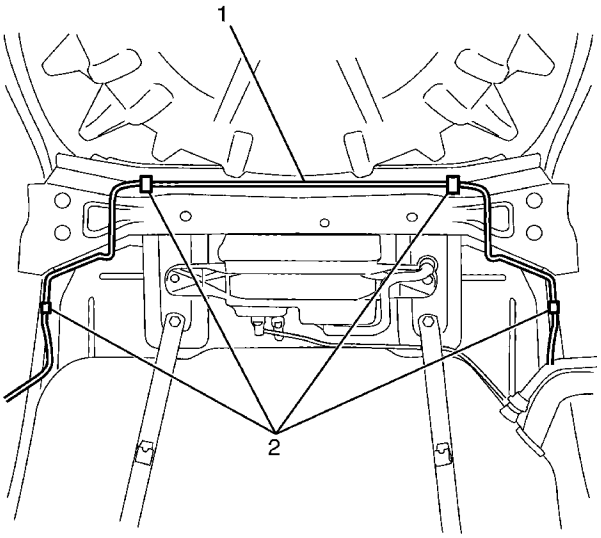


9. Remove the brake pipe (1) from the brake pipe retaining clips (2).

Rear Brake Pipe Installation Procedure - Left

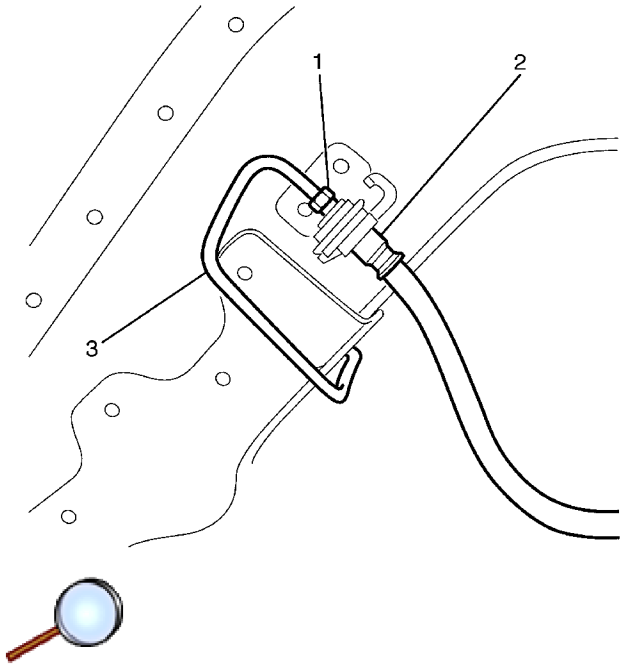
Notice: Refer to Adding Fluid to the Brake System Notice in the Preface section.

Notice: Refer to Brake Fluid Effects on Paint and Electrical Components Notice in the Preface section.



1. Install the brake pipe (1) to the brake pipe retaining clips (2).
2. Remove the rubber cap or plug from the brake hose.

Notice: Refer to Fastener Notice in the Preface section.



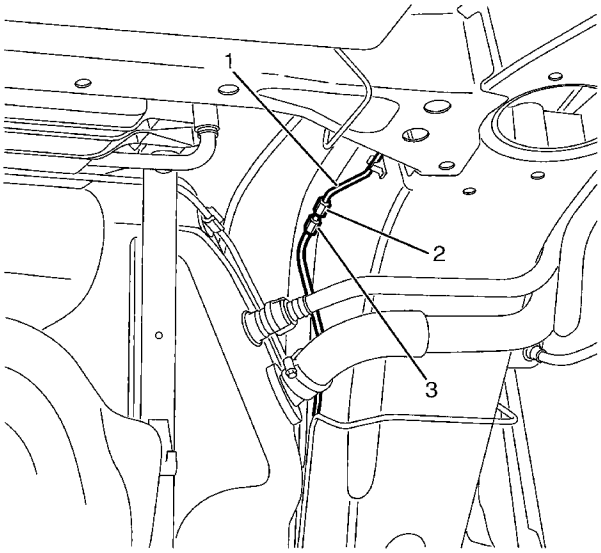
Important: Hold the brake hose (2) with a spanner whilst connecting the brake pipe fitting (1) to prevent damage to the brake pipe (3) .

3. Connect the brake pipe fitting (1) to the brake hose (3).

   Tighten
   Tighten the brake pipe fitting to 15 Nm (11 lb ft).

4. Remove the rubber cap or plug from the brake pipe union.

   Notice: Refer to Fastener Notice in the Preface section.



Important: Hold the brake pipe union (2) with a spanner whilst connecting the brake pipe fitting (3) to prevent damage to the brake pipe (2).

5. Connect the brake pipe (1) to the brake pipe union (2).

   Tighten
   Tighten the brake pipe fitting to 15 Nm (11 lb ft).

6. Install the rear suspension sub frame assembly. Refer to Rear Frame Replacement .
7. Bleed the hydraulic brake system. Refer to Hydraulic Brake System Bleeding .

Front Brake Hose Replacement

Removal Procedure

Caution: Refer to Safety Glasses Caution in the Preface section.

Caution: Refer to Vehicle Lifting Caution in the Preface section.

Caution: Refer to Brake Dust Caution in the Preface section.

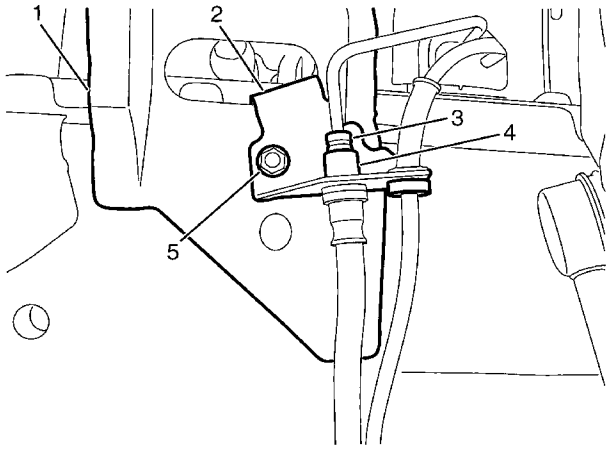
Caution: Refer to Brake Fluid Caution in the Preface section.

Caution: Refer to Brake Fluid Irritant Caution in the Preface section.

Notice: Refer to Adding Fluid to the Brake System Notice in the Preface section.

Notice: Refer to Brake Fluid Effects on Paint and Electrical Components Notice in the Preface section.

1. Raise and support the vehicle. Refer to Lifting and Jacking the Vehicle .
2. Remove the front wheels. Refer to Tire and Wheel Removal and Installation .
3. Clean all dirt and foreign material from the brake hose and the brake pipe fittings.



4. Detach the ABS wheel speed sensor wiring harness (5) from the brake hose retaining bracket (2).
5. Place a clean suitable container under the brake pipe fitting (3).

Important: Hold the brake hose (4) with a suitable tool whilst disconnecting the brake pipe fitting (3) to prevent damage to the brake pipe fitting (3).

6. Disconnect the brake pipe fitting (3) from the brake hose (4).

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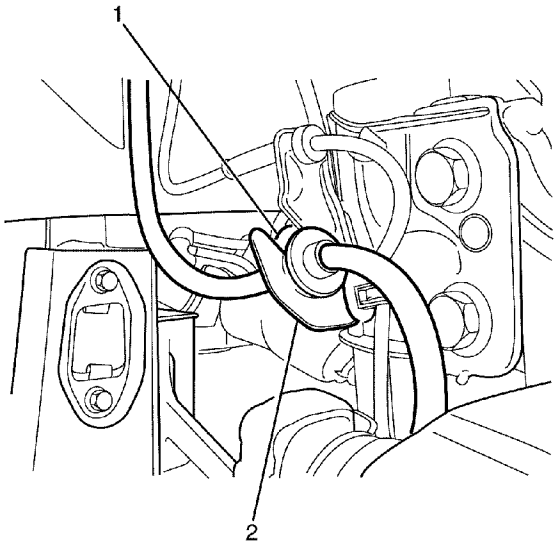
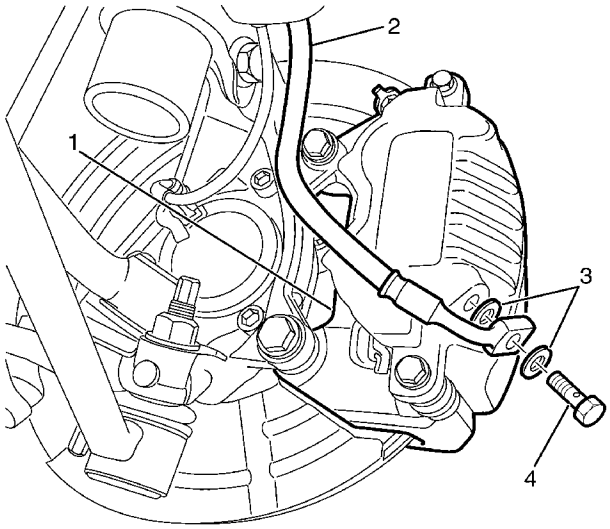
Important: Install a rubber cap or plug to the brake pipe fitting (3) in order to prevent brake fluid loss and contamination.

7. Plug the brake pipe fitting (3).
8. Remove the brake hose retaining bracket to wheel house retaining nut (6).
9. Remove the brake hose retaining bracket (2) from the wheel house (1).



10. Detach the brake hose (1) from the strut mounted brake hose retaining bracket (2).



11. Remove the brake hose to brake caliper banjo retaining bolt (4).
12. Remove the brake hose (2) from the brake caliper (1).

Important: Install a rubber cap or plug to the brake caliper (1) in order to prevent brake fluid loss and/or contamination.

13. Plug the brake hose to brake caliper banjo retaining bolt hole in the brake caliper (1).
14. Place a shop towel on a hard surface.

Important: The copper brake hose sealing washers (3) may be stuck to the brake caliper (1) and/or the brake hose (2).

15. Tap the threaded end of the brake hose to brake caliper banjo retaining bolt (4) on the shop towel to remove the copper brake hose sealing washers (3) from the brake hose to brake caliper banjo retaining bolt (4).

Important: Copper brake hose sealing washers become work hardened due to the heat generated with brake applications and will not reseal. Install NEW copper brake hose sealing washers (4) whenever the brake hose to brake caliper banjo retaining bolt (3) is removed.

16. Remove the two copper brake hose sealing washers (3).

    Discard the two copper brake hose sealing washers (3).

Installation Procedure

Caution: Refer to Safety Glasses Caution in the Preface section.

Caution: Refer to Vehicle Lifting Caution in the Preface section.

Caution: Refer to Brake Dust Caution in the Preface section.

Caution: Refer to Brake Fluid Caution in the Preface section.

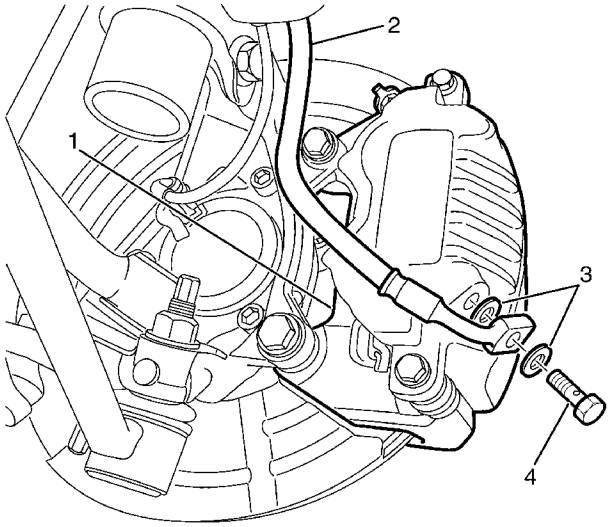
Caution: Refer to Brake Fluid Irritant Caution in the Preface section.

Notice: Refer to Adding Fluid to the Brake System Notice in the Preface section.

Notice: Refer to Brake Fluid Effects on Paint and Electrical Components Notice in the Preface section.

Notice: Make sure the brake hose is not twisted or kinked after installation. Damage to the hose could result.

1. Remove the rubber plug from the brake hose to brake caliper banjo retaining bolt hole in the brake caliper.

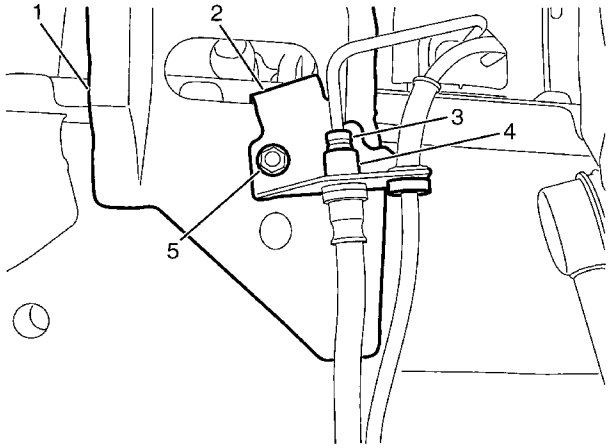


2. Assemble the NEW copper brake hose sealing washers (3), and the brake hose to brake caliper banjo retaining bolt (4) to the brake hose (2).

   Notice: Refer to Fastener Notice in the Preface section.

3. Install the brake hose (2) and brake hose to brake caliper banjo retaining bolt (4) to the brake caliper (1).

   Tighten
   Tighten the brake hose to brake caliper banjo retaining bolt to 35 Nm (26 lb ft).



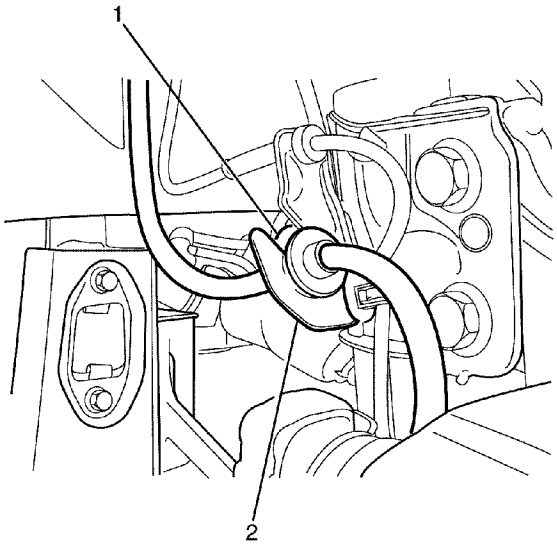
4. Position the brake hose retaining bracket (2) to the inner skirt panel (1).

5. Install the brake hose retaining bracket to inner skirt panel retaining nut (5).
6. Remove the rubber cap or plug from the brake pipe fitting (3).

Important: Hold the brake hose (4) with a back up spanner whilst connecting the brake pipe fitting (3) to prevent damage to the brake pipe fitting (3).

7. Connect the brake pipe fitting (3) to the brake hose (4).

Tighten
Tighten the brake pipe fitting to 15 Nm (11 lb ft).



Important: Slightly twist the brake hose (1) to enable the slot in the brake hose retaining bracket (2) to line up with the flat in the brake hose (1). Slide the brake hose (1) down the brake hose retaining bracket (2) and allow the brake hose to return to its untwisted position for positive engagement in the brake hose retaining bracket (2)

8. Install the brake hose (1) to the strut mounted brake hose retaining bracket (2).
9. Bleed the hydraulic brake system. Refer to Hydraulic Brake System Bleeding .
10. Install the front wheel assembly. Refer to Tire and Wheel Removal and Installation .
11. Lower the vehicle.

Rear Brake Hose Replacement

Removal Procedure

Caution: Refer to Safety Glasses Caution in the Preface section.

Caution: Refer to Vehicle Lifting Caution in the Preface section.

Caution: Refer to Brake Dust Caution in the Preface section.

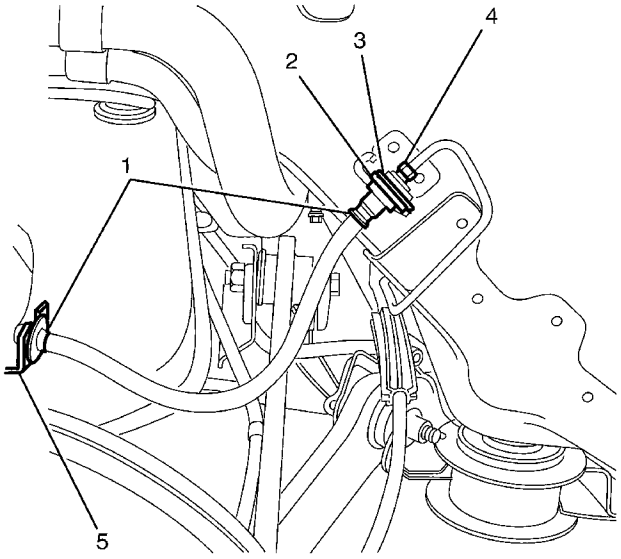
Caution: Refer to Brake Fluid Caution in the Preface section.

Caution: Refer to Brake Fluid Irritant Caution in the Preface section.

Notice: Refer to Adding Fluid to the Brake System Notice in the Preface section.

Notice: Refer to Brake Fluid Effects on Paint and Electrical Components Notice in the Preface section.

1. Raise and support the vehicle. Refer to Lifting and Jacking the Vehicle.
2. Remove the rear wheel. Refer to Tire and Wheel Removal and Installation.
3. Clean all dirt and foreign material from the brake hose and the brake pipe fittings.



4. Place a clean suitable container under the brake pipe fitting (4).

Important: Hold the brake hose (1) with a suitable tool whilst disconnecting the brake pipe fitting (4) to prevent damage to the brake pipe fitting (4).

5. Disconnect the brake pipe fitting (4) from the brake hose (1).

Important: Install a rubber cap or plug to the brake pipe fitting (4) in order to prevent

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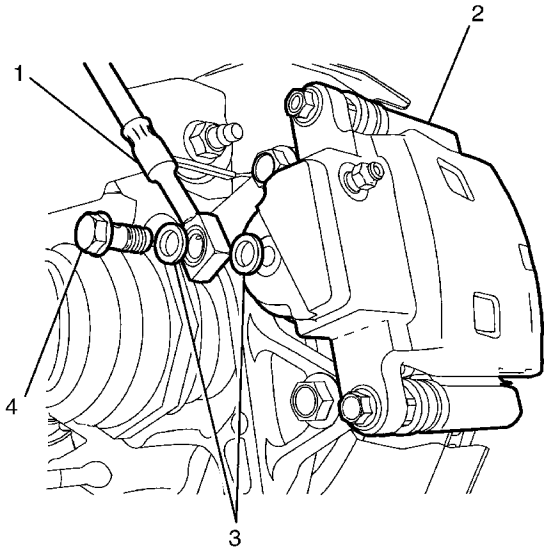
brake fluid loss and contamination.

6. Plug the brake pipe fitting (4).
7. Remove the brake hose retaining clip (2) from brake hose (1) and remove from the brake hose retaining bracket (3).
8. Detach the brake hose (1) from the upper control arm mounted brake hose retaining bracket (5).



9. Remove the brake hose to brake caliper banjo retaining bolt (4) from the brake caliper (2).
10. Remove the brake hose (1) from the brake caliper (2).

Important: Install a rubber cap or plug to the exposed brake caliper (2) in order to prevent brake fluid loss and/or contamination.

11. Plug the brake hose to brake caliper banjo retaining bolt hole in the brake caliper (2).
12. Place a shop towel on a hard surface.

Important: The copper brake hose sealing washers (3) may be stuck to the brake caliper (2) and/or the brake hose (1).

13. Tap the threaded end of the brake hose to brake caliper banjo retaining bolt (4) on the shop towel to remove the copper brake hose sealing washers (3) from the brake hose to brake caliper banjo retaining bolt (4)

Important: Copper brake hose sealing washers (3) become work hardened due to the heat generated with brake applications and will not reseal. Install NEW copper brake hose sealing washers (3) whenever the brake hose to brake caliper banjo retaining bolt (4) is removed.

14. Remove the two copper brake hose sealing washers (3).

Discard the two copper brake hose sealing washers (3).

Installation Procedure

Caution: Refer to Safety Glasses Caution in the Preface section.

Caution: Refer to Vehicle Lifting Caution in the Preface section.

Caution: Refer to Brake Dust Caution in the Preface section.

Caution: Refer to Brake Fluid Caution in the Preface section.

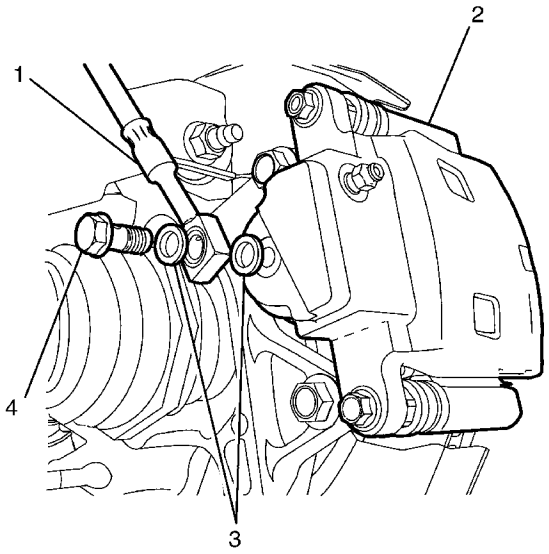
Caution: Refer to Brake Fluid Irritant Caution in the Preface section.

Notice: Refer to Adding Fluid to the Brake System Notice in the Preface section.

Notice: Refer to Brake Fluid Effects on Paint and Electrical Components Notice in the Preface section.

Notice: Make sure the brake hose is not twisted or kinked after installation. Damage to the hose could result.

1. Remove the rubber cap or plug from the brake hose to brake caliper banjo retaining bolt hole in the brake caliper.



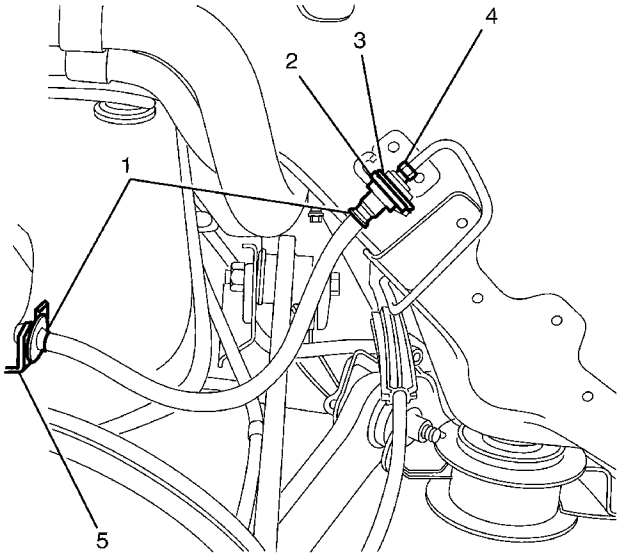
2. Assemble the NEW copper brake hose sealing washers (3), and the brake hose to brake caliper banjo retaining bolt (4) to the brake hose (1).

Notice: Refer to Fastener Notice in the Preface section.

3. Install the brake hose to brake caliper banjo retaining bolt (4) to the brake caliper (2).

Tighten
Tighten the brake hose to brake caliper banjo retaining bolt to 35 Nm (26 lb ft).

4. Remove the rubber cap or plug from the brake pipe fitting end.



5. Install the brake pipe fitting (3) to the brake hose (1) through brake hose retaining bracket (4).

   Tighten
   Tighten the brake pipe fitting to 15 Nm (11 lb ft).

6. Install the bracket retainer clip (2).

   Important: Slightly twist the brake hose (1) to enable the slot in the brake hose retaining bracket (5) to line up with the flat in the brake hose (1). Slide the brake hose (1) down the brake hose retaining bracket (5) and allow the brake hose to return to its untwisted position for positive engagement in the brake hose retaining bracket (5)

7. Attach the brake hose (1) to the upper control arm mounted brake hose retaining bracket (5).
8. Bleed the hydraulic brake system. Refer to Hydraulic Brake System Bleeding.
9. Install the rear wheel. Refer to Tire and Wheel Removal and Installation.
10. Lower the vehicle.

Hydraulic Brake System Bleeding (Manual)

Caution: Refer to Safety Glasses Caution in the Preface section.

Caution: Refer to Vehicle Lifting Caution in the Preface section.

Caution: Refer to Brake Dust Caution in the Preface section.

Caution: Refer to Brake Fluid Caution in the Preface section.

Caution: Refer to Brake Fluid Irritant Caution in the Preface section.

Notice: Refer to Brake Fluid Effects on Paint and Electrical Components Notice in the Preface section.

1. Place a clean suitable container beneath the brake master cylinder to catch brake fluid spills.

Important: "When adding fluid to the brake master cylinder reservoir, use only Super DOT 4 or DOT 4 Plus brake fluid from a clean, sealed brake fluid container. The use of any type of fluid other than the recommended type of brake fluid may cause contamination which could result in damage to the internal rubber seals and/or rubber linings of hydraulic brake system components."

Important: With the ignition OFF and the brakes cool, apply the brakes 3[dash]5 times, or until the brake pedal effort increases significantly, in order to deplete the brake booster power reserve.

2. Deplete the brake booster power reserve.
3. If you have performed a brake master cylinder bench bleed, disconnected the brake pipes from the master cylinder or the hydraulic modulator assembly, you MUST perform the following steps to bleed air at the ports of the hydraulic component:
   - 3.1. Clean the outside of the reservoir on and around the reservoir cap prior to removal.
   - 3.2. With the brake pipes installed securely to the master cylinder or hydraulic modulator assembly, loosen and separate one of the brake pipes from the port of the component:

For the hydraulic modulator assembly, perform these steps in the sequence of system flow; begin with the fluid feed pipes from the master cylinder.

   - 3.3. Allow a small amount of brake fluid to gravity bleed from the open port of the component.
   - 3.4. Reconnect the brake pipe to the component and tighten securely.
   - 3.5. With the aid of an assistant slowly depress the brake pedal fully and maintain steady pressure on the pedal.
   - 3.6. Loosen the same brake pipe to purge air from the open port of the component.
   - 3.7. Tighten the brake pipe, then have the assistant slowly release the brake pedal.
   - 3.8. Wait 15 seconds, then repeat steps 3.3[dash]3.7 until all air is purged from the same port of each component.
   - 3.9. With the brake pipe installed securely to the master cylinder or hydraulic modulator

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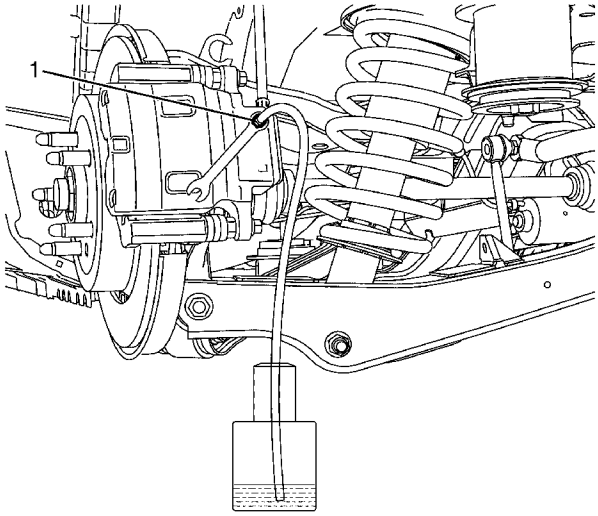
assembly, and after all air has been purged from the first port of the component that was bled, loosen and separate the next brake pipe from the component, then repeat steps 3.3[dash]3.8 until each of the ports on the component has been bled.

3.10. After completing the final component port bleeding procedure, make sure that each of the brake pipe to component fittings is correctly tightened.

4. Clean the outside of the brake master cylinder reservoir on and around the reservoir cap.

Important: Make sure the brake master cylinder reservoir remains at least half-full during this bleeding procedure. Add fluid as needed to maintain the correct level.

5. Remove the master cylinder reservoir cap.
6. Raise and support the vehicle. Refer to Lifting and Jacking the Vehicle .
7. Remove the wheels. Refer to Tire and Wheel Removal and Installation .



8. Fit a correct sized ring spanner onto the LEFT REAR wheel hydraulic circuit bleeder valve (1).
9. Install a transparent hose over the end of the wheel hydraulic circuit bleeder valve (1).
10. Submerge the open end of the transparent hose into a container partially filled with brake fluid from a clean, sealed brake fluid container.
11. Have an assistant slowly depress the brake pedal fully and maintain steady pressure on the pedal.
12. Loosen the bleeder valve to purge air from the wheel hydraulic circuit.
13. Tighten the bleeder valve, then have the assistant slowly release the brake pedal.
14. Wait 15 seconds, then repeat steps 11-13 until all air is purged from the wheel hydraulic circuit.
15. Tighten the wheel circuit bleeder valve securely.
16. Fit a correct sized ring spanner onto the RIGHT REAR wheel hydraulic circuit bleeder valve.
17. Repeat steps 9[dash]15.
18. Fit a correct sized ring spanner onto the LEFT FRONT wheel hydraulic circuit (inboard GXP) bleeder valve.
19. Repeat steps 9[dash]15.
20. For GXP models, fit a correct sized ring spanner onto the LEFT FRONT wheel hydraulic circuit outer bleeder valve.
21. Repeat steps 9[dash]15.
22. Fit a correct sized ring spanner onto the RIGHT FRONT wheel hydraulic circuit (inboard GXP) bleeder valve.

23. Repeat steps 9[dash]15.
24. For GXP models, fit a correct sized ring spanner onto the RIGHT FRONT wheel hydraulic circuit outer bleeder valve.
25. Repeat steps 9[dash]15.
26. After completing the final wheel hydraulic circuit bleeding procedure, make sure that each of the 4 wheel hydraulic circuit bleeder valves is correctly tightened.
27. Install the wheels. Refer to Tire and Wheel Removal and Installation .
28. Lower the vehicle.
29. Fill the brake master cylinder reservoir to the maximum-fill level with brake fluid from a clean, sealed brake fluid container.
30. Slowly depress and release the brake pedal. Observe the feel of the brake pedal.

Important: If it is determined that air was induced into the system upstream of the hydraulic modulator assembly prior to servicing, the Antilock Brake System Automated Bleed Procedure must be performed. Refer to Antilock Brake System Automated Bleed Procedure .

31. If the brake pedal feels spongy, repeat the bleeding procedure again. If the brake pedal still feels spongy after repeating the bleeding procedure, perform the following steps:
    31.1. Inspect the brake system for external leaks. Refer to Brake System External Leak Inspection .
    31.2. Pressure bleed the hydraulic brake system in order to purge any air that may still be trapped in the system.
32. Turn the ignition ON, engine OFF. Check to see if the brake system warning lamp is illuminated.

Important: DO NOT allow the vehicle to be driven until it is diagnosed and repaired.

33. If the brake system warning lamp is illuminated, refer to Symptoms - Hydraulic Brakes .

Hydraulic Brake System Bleeding (Pressure)

Tools Required

- J 29532 Diaphragm Pressure Bleeder
- J 35589-A Brake Pressure Bleeder Adapter

Caution: Refer to Safety Glasses Caution in the Preface section.

Caution: Refer to Vehicle Lifting Caution in the Preface section.

Caution: Refer to Brake Dust Caution in the Preface section.

Caution: Refer to Brake Fluid Caution in the Preface section.

Caution: Refer to Brake Fluid Irritant Caution in the Preface section.

Notice: Refer to Brake Fluid Effects on Paint and Electrical Components Notice in the Preface section.

1. Place a clean suitable container beneath the brake master cylinder to catch brake fluid spills.

Important: "When adding fluid to the brake master cylinder reservoir, use only Super DOT 4 or DOT 4 Plus brake fluid from a clean, sealed brake fluid container. The use of any type of fluid other than the recommended type of brake fluid may cause contamination which could result in damage to the internal rubber seals and/or rubber linings of hydraulic brake system components."

Important: With the ignition OFF and the brakes cool, apply the brakes 3-5 times, or until the brake pedal becomes firm, in order to deplete the vacuum brake booster power reserve.

2. Deplete the vacuum brake booster power reserve.
3. If you have performed a brake master cylinder bench bleed, disconnected the brake pipes from the master cylinder or the Brake Pressure Modulator Valve (BPMV), you MUST perform the following steps to bleed air at the ports of the hydraulic component:
   3.1. Clean the outside of the reservoir on and around the reservoir cap prior to removal.
   3.2. With the brake pipes installed securely to the master cylinder or BPMV, loosen and separate one of the brake pipes from the port of the component:

For the BPMV, perform these steps in the sequence of system flow; begin with the fluid feed pipes from the master cylinder.

   3.3. Allow a small amount of brake fluid to gravity bleed from the open port of the component.
   3.4. Reconnect the brake pipe to the component and tighten securely.
   3.5. With the aid of an assistant slowly depress the brake pedal fully and maintain steady pressure on the pedal.
   3.6. Loosen the same brake pipe to purge air from the open port of the component.

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3.7. Tighten the brake pipe, then have the assistant slowly release the brake pedal.

3.8. Wait 15 seconds, then repeat steps 3.3-3.7 until all air is purged from the same port of each component.

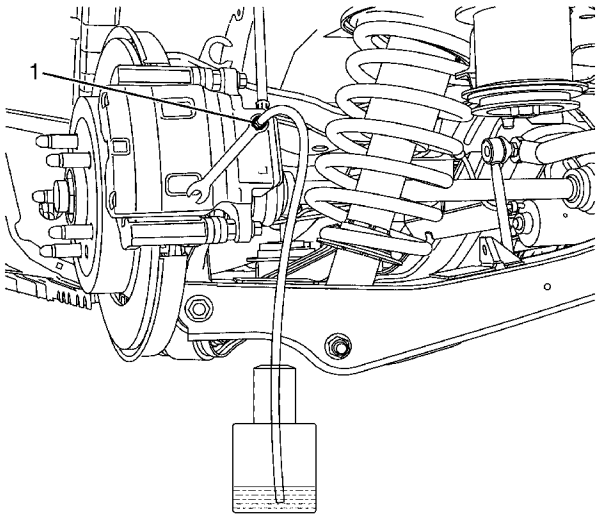
3.9. With the brake pipe installed securely to the master cylinder or BPMV, and after all air has been purged from the first port of the component that was bled, loosen and separate the next brake pipe from the component, then repeat steps 3.3-3.8 until each of the ports on the component has been bled.

3.10. After completing the final component port bleeding procedure, make sure that each of the brake pipe to component fittings is correctly tightened.

4. Clean the outside of the reservoir on and around the reservoir cap.
5. Remove the master cylinder reservoir cap and diaphragm.
6. Fill the brake master cylinder reservoir to the maximum-fill level with brake fluid from a clean, sealed brake fluid container.
7. Set up the brake pressure bleeder following the manufacturer's instructions.
8. Open the brake pressure bleeder fluid valve to allow pressurised brake fluid to enter the brake system.

Important: Any brake fluid leaks identified require repair prior to completing this procedure.

9. Wait approximately 30 seconds, then inspect the entire hydraulic brake system in order to make sure that there are no existing external brake fluid leaks.
10. Raise and support the vehicle. Refer to Lifting and Jacking the Vehicle .
11. Remove the wheels. Refer to Tire and Wheel Removal and Installation .



Important: Make sure the brake master cylinder reservoir remains at least half-full during this bleeding procedure. Add fluid as needed to maintain the correct level.

12. Fit a suitable tool onto the LEFT REAR wheel hydraulic circuit bleeder valve (1).
13. Install a transparent hose over the end of the wheel hydraulic circuit bleeder valve (1).
14. Submerge the open end of the transparent hose into a container partially filled with brake fluid from a clean, sealed brake fluid container.
15. Loosen the bleeder valve to purge air from the wheel hydraulic circuit. Allow fluid to flow until air bubbles stop flowing from the bleeder, then tighten the bleeder valve.

16. Tighten the wheel circuit bleeder valve securely.
17. Fit a suitable tool onto the RIGHT REAR wheel hydraulic circuit bleeder valve.
18. Repeat steps 13-15.
19. Tighten the wheel circuit bleeder valve securely.
20. Fit a suitable tool onto the LEFT FRONT wheel hydraulic circuit (inboard GXP) bleeder valve.
21. Repeat steps 13-15.
22. Tighten the wheel circuit bleeder valve securely.
23. For GXP models, fit a correct sized ring spanner onto the LEFT FRONT wheel hydraulic circuit outer bleeder valve.
24. Repeat steps 13-15.
25. Tighten the wheel circuit bleeder valve securely.
26. Fit a suitable tool onto the RIGHT FRONT wheel hydraulic circuit (inboard GXP) bleeder valve.
27. Repeat steps 13-15.
28. Tighten the wheel circuit bleeder valve securely.
29. For GXP models, fit a correct sized ring spanner onto the RIGHT FRONT wheel hydraulic circuit outer bleeder valve.
30. Repeat steps 13-15.
31. Tighten the wheel circuit bleeder valve securely.
32. After completing the final wheel hydraulic circuit bleeding procedure, make sure that each wheel hydraulic circuit bleeder valve is correctly tightened.
33. Close the brake pressure bleeder fluid valve.
34. Install the wheels. Refer to Tire and Wheel Removal and Installation .
35. Lower the vehicle.
36. Remove the brake pressure bleeder from the brake master cylinder reservoir.
37. Fill the brake master cylinder reservoir to the maximum-fill level with brake fluid from a clean, sealed brake fluid container.
38. Slowly depress and release the brake pedal. Observe the feel of the brake pedal.

    Important: If it is determined that air was induced into the system upstream of the BPMV prior to servicing, the Antilock Brake System Automated Bleed Procedure must be performed. Refer to Antilock Brake System Automated Bleed Procedure .

39. If the brake pedal feels spongy, repeat the bleeding procedure again. If the brake pedal still feels spongy after repeating the bleeding procedure, perform the following step:

    Inspect the brake system for external leaks. Refer to Brake System External Leak Inspection .

40. Turn the ignition ON, engine OFF. Check to see if the brake system warning lamp is illuminated.

    Important: DO NOT allow the vehicle to be driven until it is diagnosed and repaired.

41. If the brake system warning lamp is illuminated, refer to Symptoms - Hydraulic Brakes .

Power Vacuum Brake Booster Replacement

Removal Procedure

Caution: Refer to Battery Disconnect Caution in the Preface section.

Important: The electrical system of the vehicle must be disabled to prevent operation of the wiper system while working in the vicinity of the wiper motor and linkages. Operation of the wiper system while working in the vicinity of the wiper motor and linkages may cause personal injury.

1. Disconnect the battery ground cable. Refer to Battery Negative Cable Disconnection and Connection .

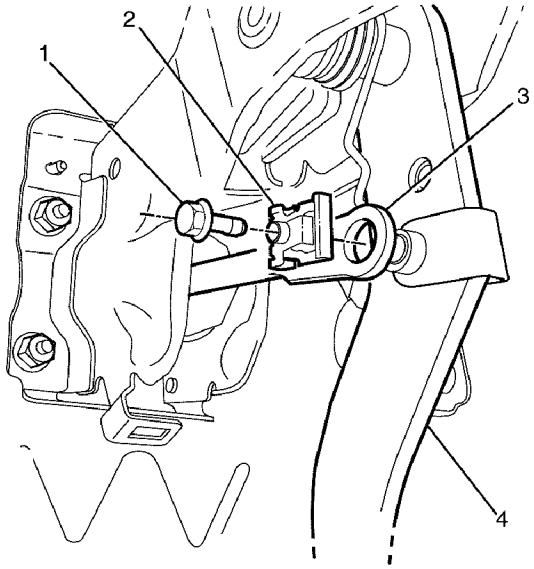
   Caution: Refer to Brake Fluid Caution in the Preface section.

   Caution: Refer to Brake Fluid Irritant Caution in the Preface section.

   Notice: Refer to Adding Fluid to the Brake System Notice in the Preface section.

   Notice: Refer to Brake Fluid Effects on Paint and Electrical Components Notice in the Preface section.

2. Remove the knee bolster. Refer to Knee Bolster Replacement .
3. Remove the instrument panel insulator panel. Refer to Instrument Panel Insulator Panel Replacement - Left Side .
4. Remove the instrument panel retainer. Refer to Instrument Panel Retainer Replacement .
5. Remove the power brake booster vacuum sensor from the vehicle if fitted. Refer to Power Brake Booster Vacuum Sensor Replacement .
6. Remove the master cylinder from the vehicle. Refer to Master Cylinder Replacement .
7. Remove the vacuum hose and check valve from the vacuum brake booster. Refer to Power Brake Booster Inlet Hose Replacement .



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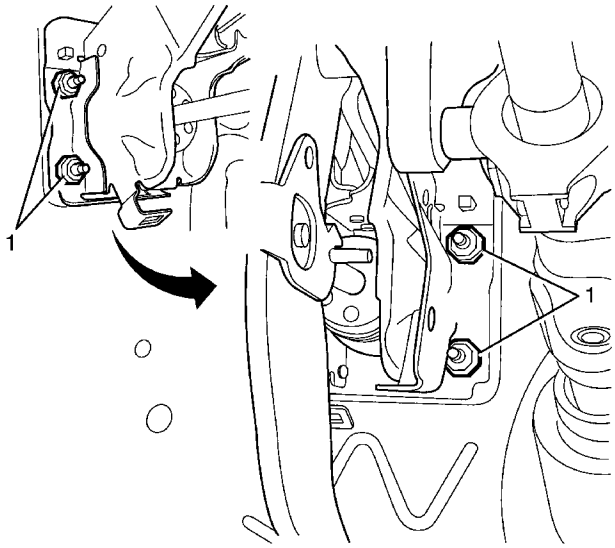
8. Remove the brake pedal pushrod retaining bolt (1), clip (2) and the brake pedal pushrod (3) from the brake pedal (4).



9. Remove the vacuum brake booster to brake pedal support bracket retaining nuts (1).

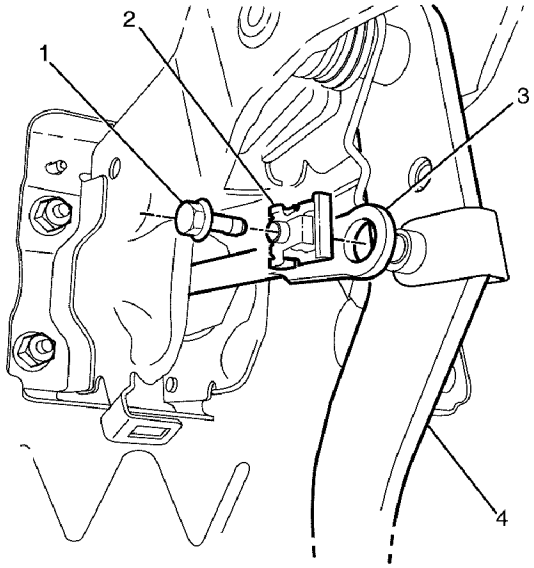
Important: From the engine compartment, pull the vacuum brake booster forward to release the four studs from the bulkhead and brake pedal support bracket.

10. Remove the vacuum brake booster from the vehicle.

Installation Procedure

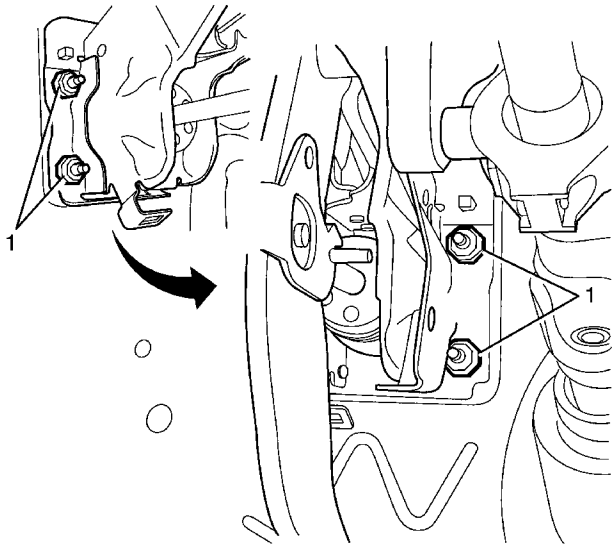
Notice: Refer to Adding Fluid to the Brake System Notice in the Preface section.

1. With the aid of an assistant, install the vacuum brake booster from the engine compartment. Make sure the vacuum brake booster's four studs are correctly located in the bulkhead and brake pedal support bracket.



2. Install the brake pedal push rod (3), clip (2) and brake pedal push rod retaining bolt (1) to the brake pedal (4).

Notice: Refer to Fastener Notice in the Preface section.



3. Install the vacuum brake booster to brake pedal support bracket retaining nuts (1).

Tighten
Tighten the nuts to 23 N·m. (17 lb ft

4. Install the vacuum hose and check valve to the vacuum brake booster. Refer to Power Brake Booster Inlet Hose Replacement .

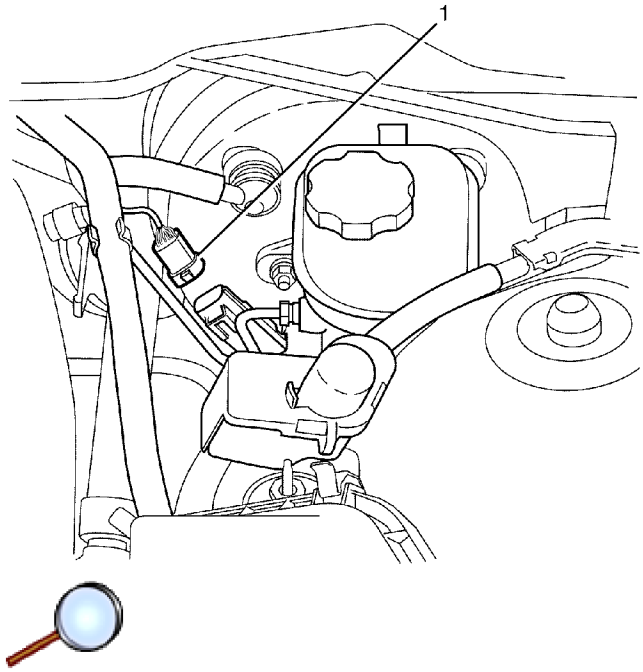
5. Install the master cylinder to the vacuum brake booster. Refer to Master Cylinder Replacement .
6. Install the power brake booster vacuum sensor from the vehicle if fitted. Refer to Power Brake Booster Vacuum Sensor Replacement .
7. Bleed the braking system. Refer to Hydraulic Brake System Bleeding .
8. Install the instrument panel retainer. Refer to Instrument Panel Retainer Replacement .
9. Install the instrument panel insulator panel. Refer to Instrument Panel Insulator Panel Replacement - Left Side .
10. Install the knee bolster. Refer to Knee Bolster Replacement .
11. Connect the battery ground cable. Refer to Battery Negative Cable Disconnection and Connection .

Power Brake Booster Vacuum Sensor Replacement

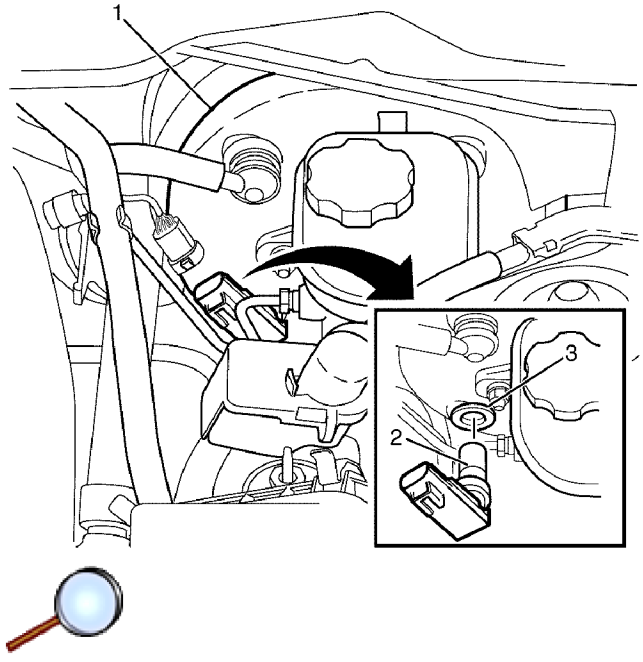
Removal Procedure

Important: With the ignition OFF and the brakes cool, apply the brakes 3-5 times, or until the brake pedal becomes firm, in order to deplete the vacuum brake booster power reserve.

1. Deplete the vacuum brake booster power reserve.



2. Disconnect the brake booster vacuum sensor electrical connector (1).



Important: Pull the brake booster vacuum sensor (2) towards the front of the vehicle to

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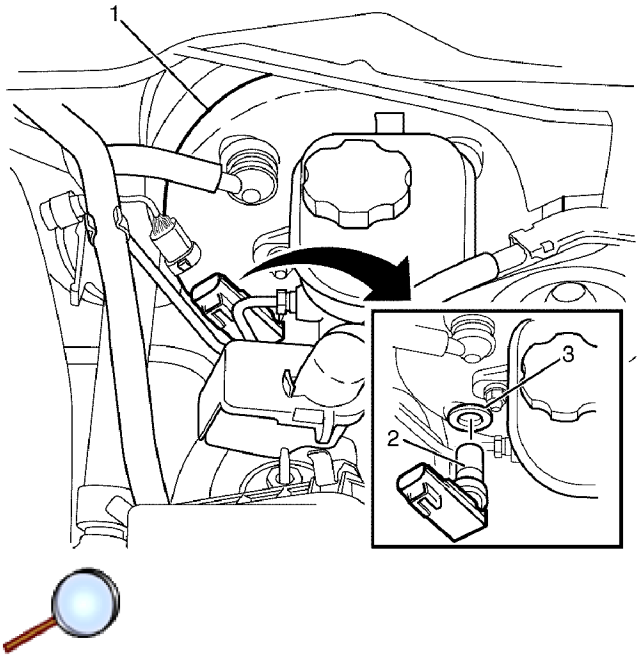
remove.

3. Remove the brake booster vacuum sensor (2) from the brake booster (1).
4. Remove the brake booster vacuum sensor rubber grommet (3) from the brake booster (1).

   Discard the brake booster vacuum sensor rubber grommet.

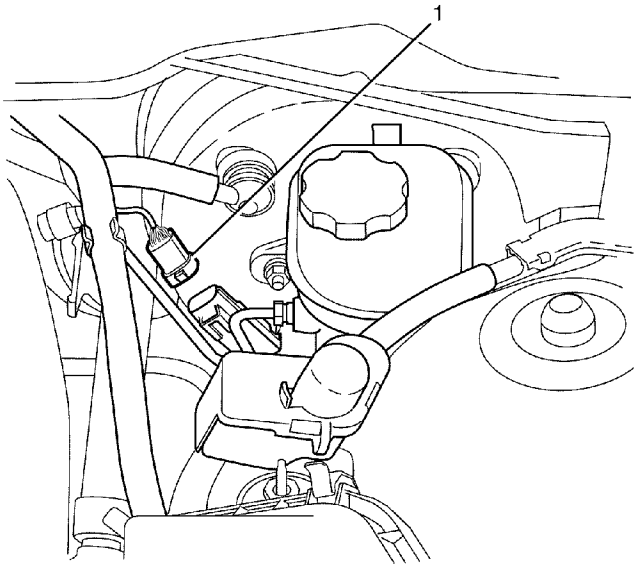
Installation Procedure



1. Install the NEW booster vacuum sensor rubber grommet (3) to the brake booster (1).

   Important: Push the brake booster vacuum sensor (2) to install it to the brake booster (1).

2. Install the brake booster vacuum sensor (2) to the brake booster (1).



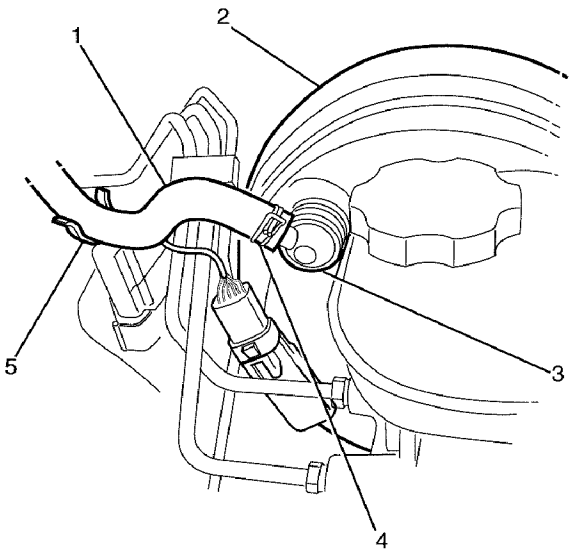
3. Connect the brake booster vacuum sensor electrical connector (1).

Power Brake Booster Inlet Hose Replacement (6.0L Engine)

Removal Procedure

Caution: Refer to Battery Disconnect Caution in the Preface section.

1. Disconnect the battery ground cable. Refer to Battery Negative Cable Disconnection and Connection .



Important: With the ignition OFF and the brakes cool, apply the brakes 3-5 times, or until the brake pedal becomes firm, in order to deplete the vacuum brake booster power reserve.

2. Deplete the vacuum brake booster power reserve.
3. Remove the engine dress cover. Refer to Engine Cover Replacement
4. Compress the vacuum hose retaining clamp (4) at the vacuum brake booster (2) end and slide 50 mm (2 in) back along the vacuum hose (1).
5. Disconnect the vacuum hose (1) and the vacuum brake booster check valve (3) from the vacuum brake booster (2).
6. Detach the vacuum hose (1) from the bulkhead mounted vacuum hose retaining bracket (5).

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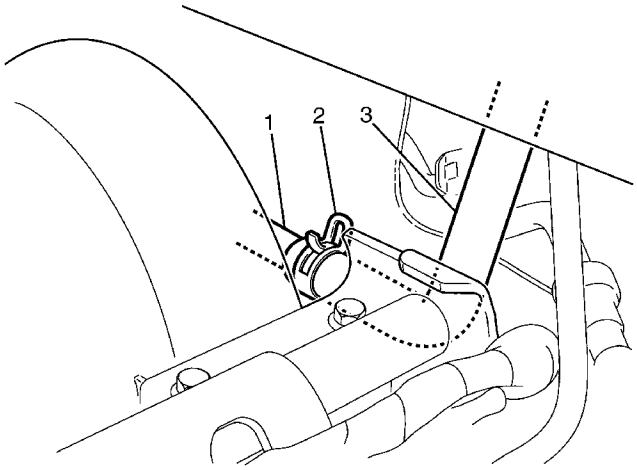
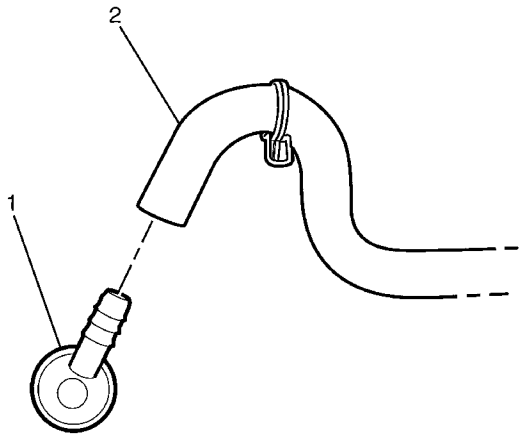
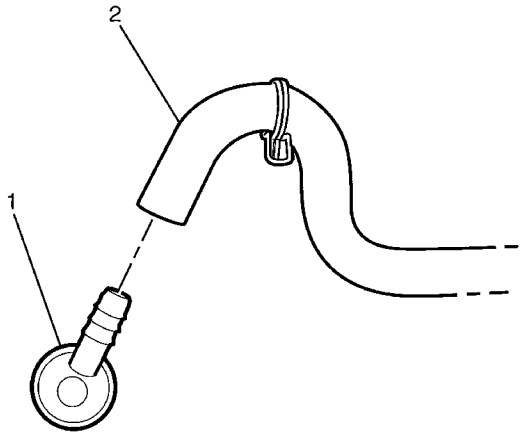


7. Compress the vacuum hose retaining clamp (2) at the intake manifold vacuum port (1) and slide 50 mm (2 in) back along the vacuum hose (3).
8. Disconnect the vacuum hose (3) from the intake manifold vacuum port (1).

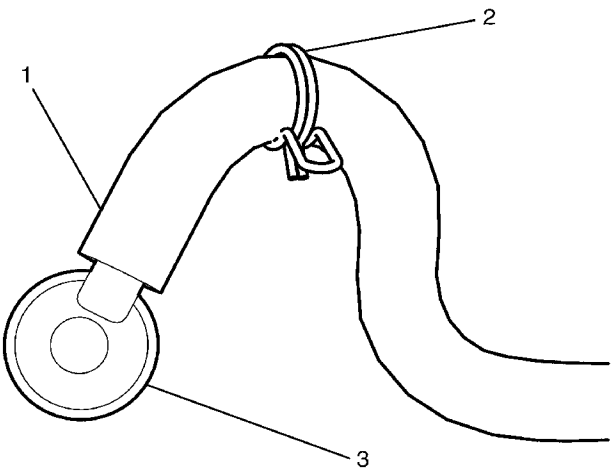


9. Remove the vacuum brake booster check valve (1) from the vacuum hose (2).

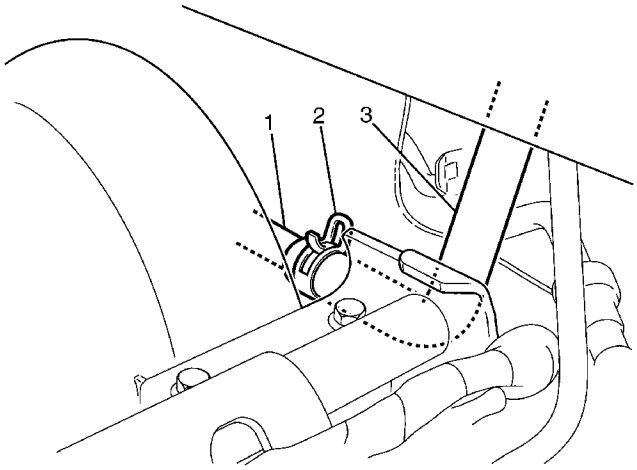
Installation Procedure



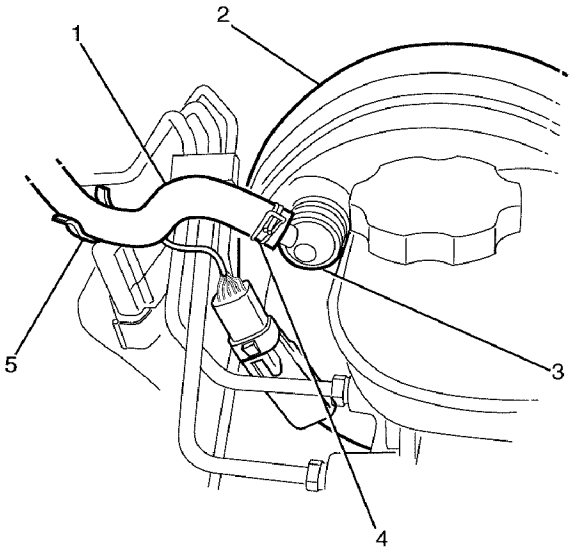
1. Install the vacuum brake booster check valve (1) to the vacuum hose (2).



2. Install the vacuum hose retaining clamp (2) to the correct location on the vacuum hose (1) to secure the vacuum brake booster check valve (3).



3. Connect the vacuum hose (3) to the intake manifold vacuum port (1).
4. Compress the vacuum hose retaining clamp (2) and slide along the vacuum hose (3) to the correct location to secure the vacuum hose (3) to the intake manifold vacuum port (1).



5. Connect the vacuum hose (1) and vacuum brake booster check valve (3) to vacuum brake booster (2).

Important: Make sure the vacuum hose (1) is not twisted. Compress the vacuum hose retaining clamp (4) and rotate the vacuum brake booster check valve (3) as required.

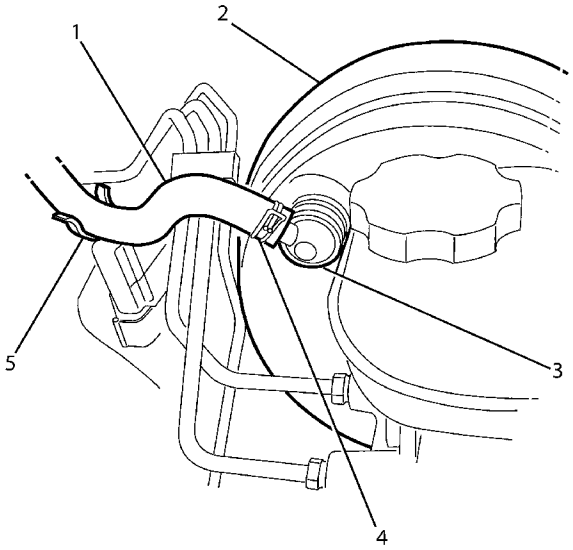
6. Attach the vacuum hose (1) to the bulkhead mounted vacuum hose retaining bracket (5).
7. Install the engine dress cover. Refer to Engine Cover Replacement
8. Connect the battery ground cable. Refer to Battery Negative Cable Disconnection and Connection .

Power Brake Booster Inlet Hose Replacement (3.6L Engine)

Removal Procedure

Caution: Refer to Battery Disconnect Caution in the Preface section.

1. Disconnect the battery ground cable. Refer to Battery Negative Cable Disconnection and Connection .



Important: With the ignition OFF and the brakes cool, apply the brakes 3-5 times, or until the brake pedal becomes firm, in order to deplete the vacuum brake booster power reserve.

2. Deplete the vacuum brake booster power reserve.
3. Remove the engine dress cover. Refer to Engine Cover Replacement
4. Compress the vacuum hose retaining clamp (4) at the vacuum brake booster (2) end and slide 50 mm (2 in) along the vacuum hose (1).
5. Disconnect the vacuum hose (1) and the vacuum brake booster check valve (3) from the vacuum brake booster (2).
6. Detach the vacuum hose (1) from the bulkhead mounted vacuum hose retaining bracket (5).

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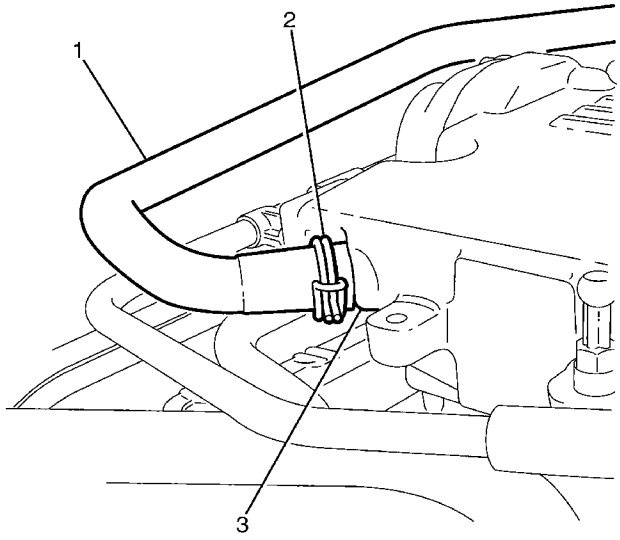
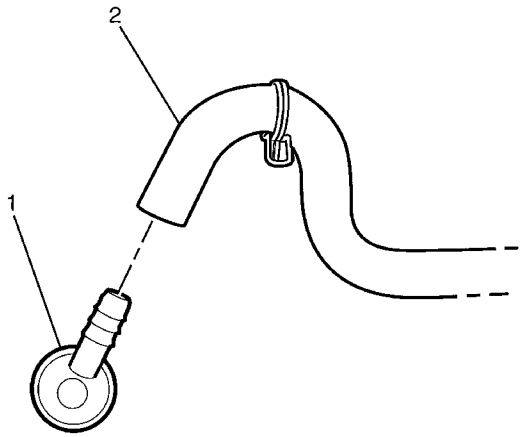
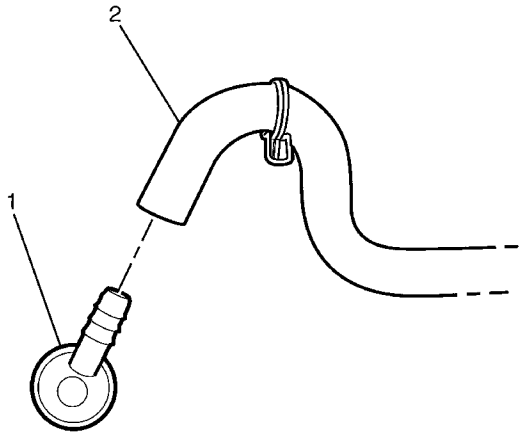


7. Compress the vacuum hose retaining clamp (2) at the intake manifold vacuum port (3) and slide 50 mm (2 in) along the vacuum hose (1).
8. Disconnect the vacuum hose (1) from the intake manifold vacuum port (3).

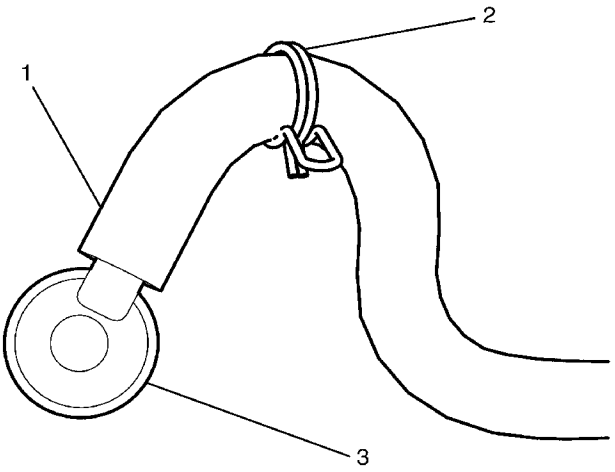


9. Remove the vacuum brake booster check valve (1) from the vacuum hose (2).

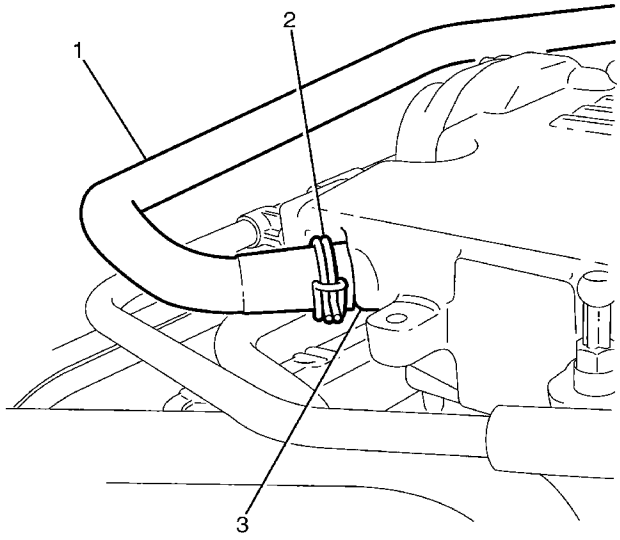
Installation Procedure



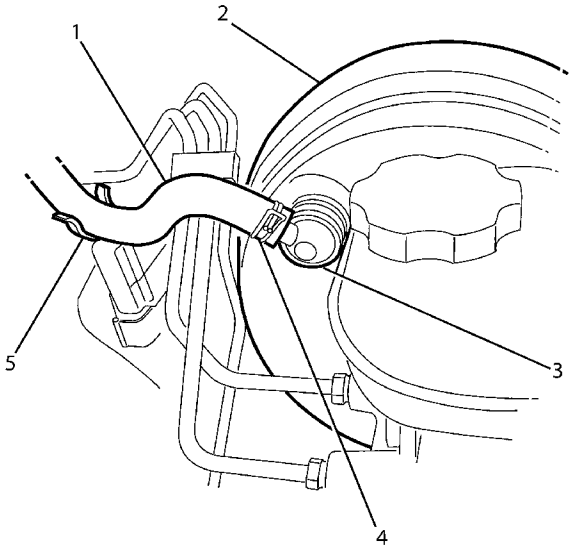
1. Install the vacuum brake booster check valve (1) to the vacuum hose (2).



2. Install the vacuum hose retaining clamp (2) to the correct location on the vacuum hose (1) to secure the vacuum brake booster check valve (3).



3. Connect the vacuum hose (1) to the intake manifold vacuum port (3).
4. Compress the vacuum hose retaining clamp (2) and slide along the vacuum hose (1) to the correct location, to secure the vacuum hose (1) to the intake manifold vacuum port (3)



5. Connect the vacuum hose (1) and the vacuum brake booster check valve (3) to vacuum brake booster (2).

Important: Make sure the vacuum hose (1) is not twisted. Compress the vacuum hose retaining clamp (4) and rotate the vacuum brake booster check valve (3) as required.

6. Attach the vacuum hose (1) to the bulkhead mounted vacuum hose retaining bracket (5).
7. Install the engine dress cover. Refer to Engine Cover Replacement
8. Connect the battery ground cable. Refer to Battery Negative Cable Disconnection and Connection .

Fastener Tightening Specifications

Up to - 05 Mar 2007

Application	Specification	
	Metric	English
Park Brake Cable Guide Bolt	22 Nm	18 lb ft
Park Brake Cable Guide Nut	9 Nm	80 lb in
Park Brake Cable Mounting Bracket Bolt	22 Nm	16 lb ft
Park Brake Handle Assembly Mounting Nuts	1.5 Nm	18 lb in
Park Brake Warning Lamp Switch Bolt	1.5 Nm	18 lb in

From - 05 Mar 2007

Application	Specification	
	Metric	English
Park Brake Cable Guide Bolt	22 Nm	18 lb ft
Park Brake Cable Guide Nut	11 Nm	97 lb in
Park Brake Cable Mounting Bracket Bolt	22 Nm	16 lb ft
Park Brake Handle Assembly Mounting Nuts	1.5 Nm	18 lb in
Park Brake Warning Lamp Switch Bolt	1.5 Nm	18 lb in

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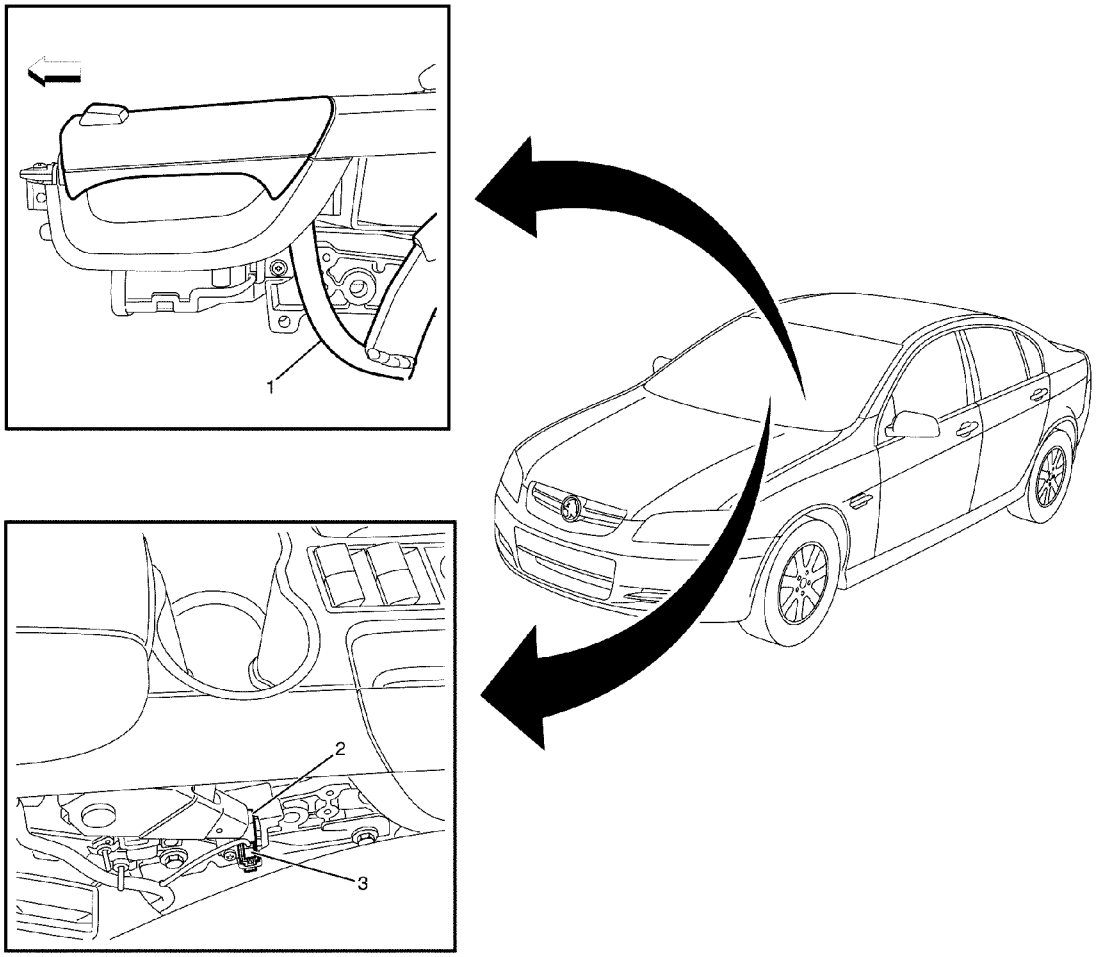
Park Brake System Component Views

Park Brake Subsystem Components



(1) Park Brake Assembly
(2) Park Brake Switch
(3) Park Brake Switch Electrical Connector

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Parking Brake Shoe Replacement

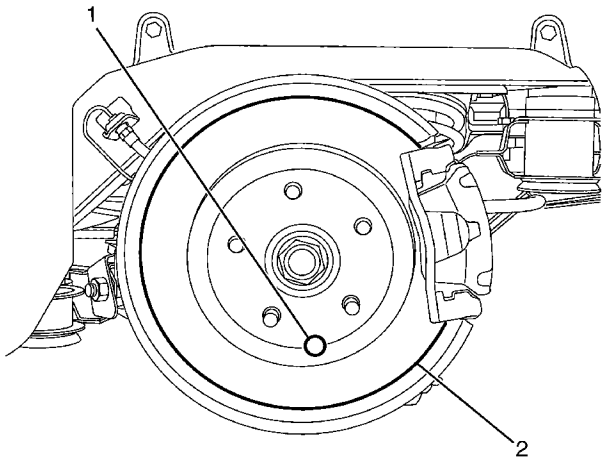
Removal Procedure

Caution: Refer to Safety Glasses Caution in the Preface section.

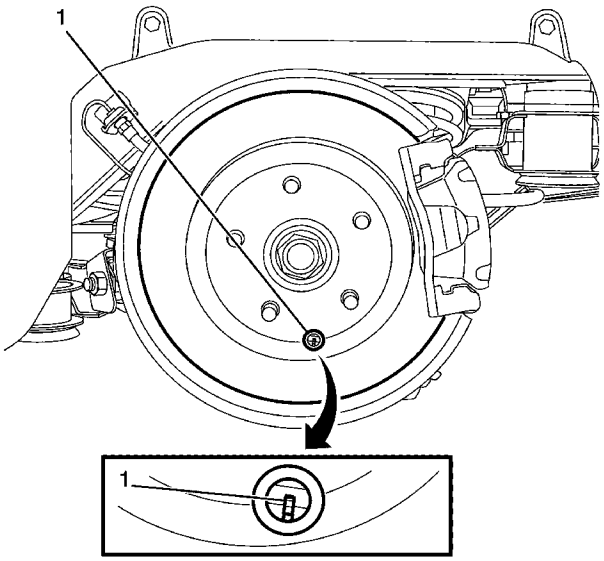
Caution: Refer to Vehicle Lifting Caution in the Preface section.

Caution: Refer to Brake Dust Caution in the Preface section.

1. Raise and support the vehicle. Refer to Lifting and Jacking the Vehicle.
2. Remove the rear tire and wheel assembly. Refer to Tire and Wheel Removal and Installation.



3. Remove the park brake adjustment access hole plug (1) from the brake disc (2).



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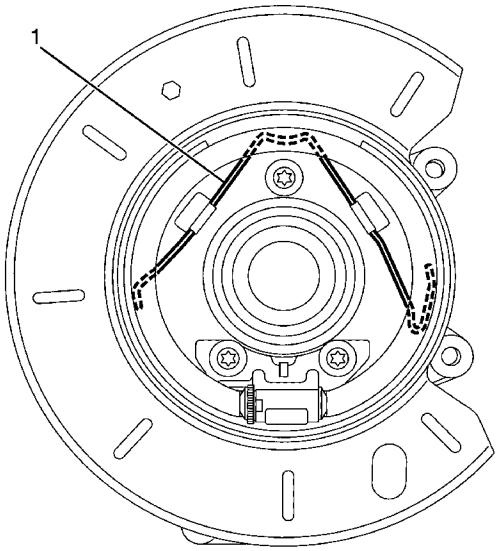
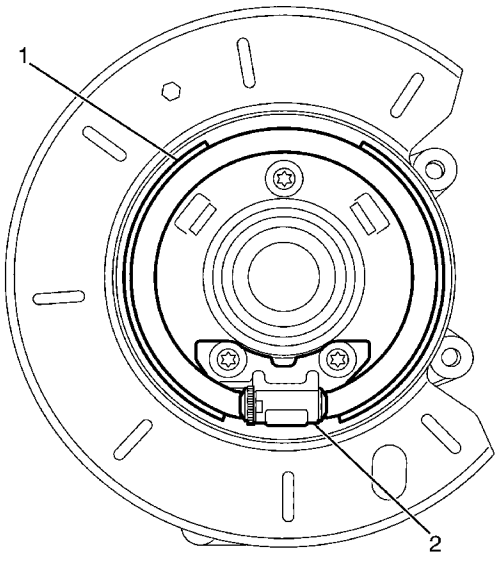
4. Rotate the park brake adjuster nut (1) until all park brake shoe adjustment has been removed.
5. Remove the rear brake caliper and brake disc. Refer to Rear Brake Rotor Replacement.
6. Remove the wheel bearing and hub assembly. Refer to Rear Wheel Bearing and Hub Replacement.



7. Remove the park brake shoe retaining spring (1).



Important: Detach the park brake shoe (1) from the actuator assembly (2) by grasping the park brake shoe assembly (1) and pushing upwards.

8. Detach the park brake shoe (1) from the actuator assembly (2).

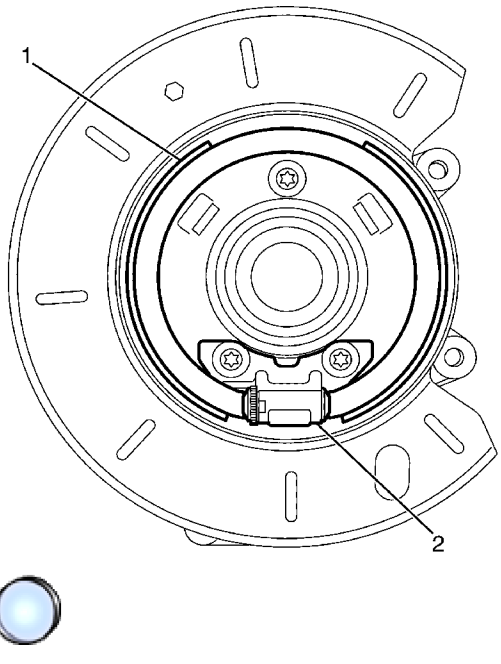
9. Remove the park brake shoe (1).

Installation Procedure

Caution: Refer to Safety Glasses Caution in the Preface section.

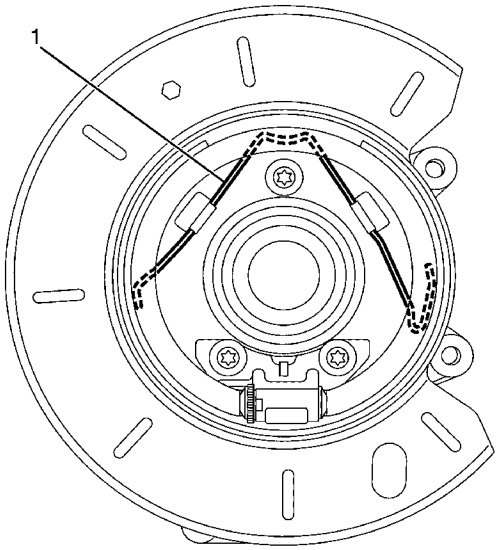
Caution: Refer to Vehicle Lifting Caution in the Preface section.

Caution: Refer to Brake Dust Caution in the Preface section.



Important: Attach the park brake shoe assembly (1) to the actuator assembly (2) by grasping the park brake shoe assembly (1) and spreading slightly while pulling the shoe over the actuator assembly (2).

1. Attach the park brake shoe assembly (1) to the actuator assembly (2).

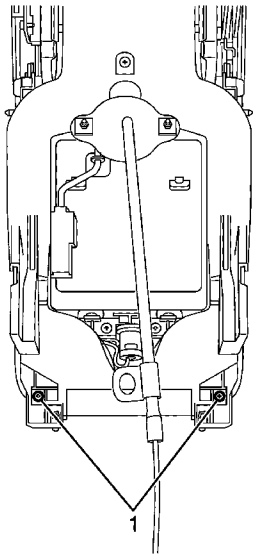


2. Install the parking brake shoe retaining spring (1).
3. Install the wheel bearing and hub assembly. Refer to Rear Wheel Bearing and Hub Replacement.
4. Install the rear brake disc and rear brake caliper. Refer to Rear Brake Rotor Replacement.
5. Adjust the park brake. Refer to Park Brake Adjustment.
6. Install the rear tire and wheel assembly. Refer to Tire and Wheel Removal and Installation.
7. Lower the vehicle.

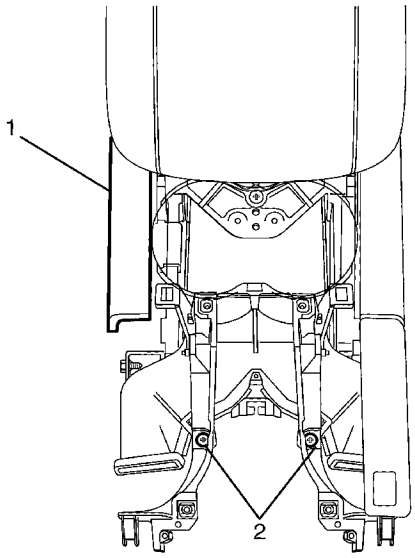
Parking Brake Release Handle Assembly Replacement

Removal Procedure

1. Remove the front floor console assembly. Refer to Front Floor Console Replacement .



2. Remove the rear front floor console cover assembly to rear floor air outlet duct retaining screws (1).



3. Remove the front floor console cover assembly to rear floor air outlet duct retaining screws (2).
4. Remove the front floor console cover assembly (1).

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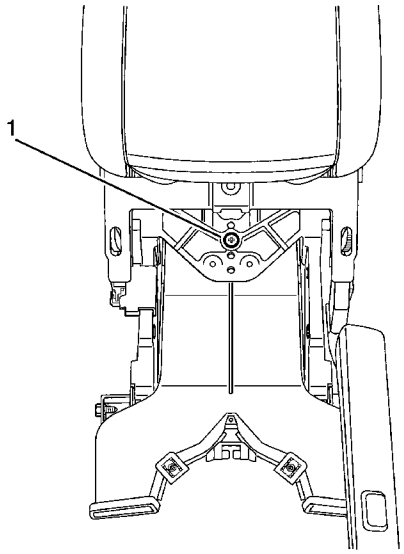
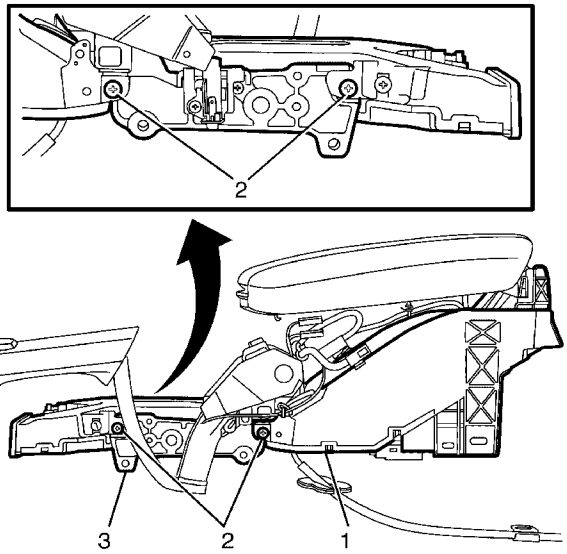
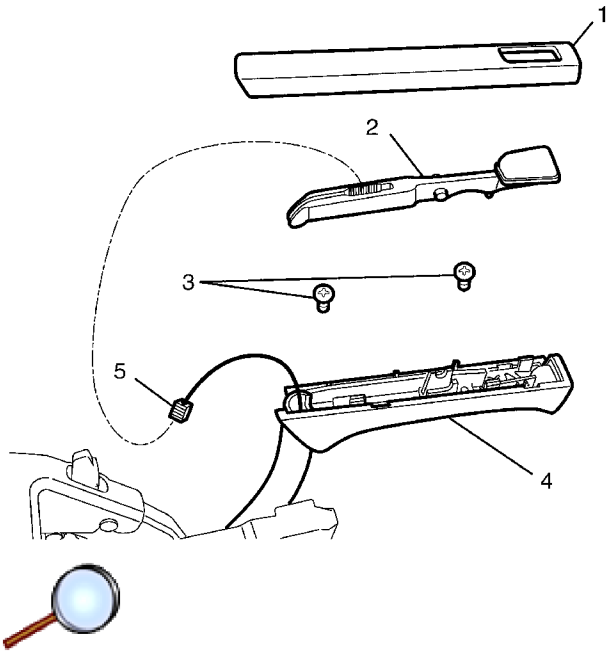


5. Remove the rear floor air outlet duct to park brake assembly retaining screw (1).



6. Remove the rear floor air outlet duct to park brake assembly retaining screws (2).
7. Remove the park brake assembly (3) from the rear floor air outlet duct (1).

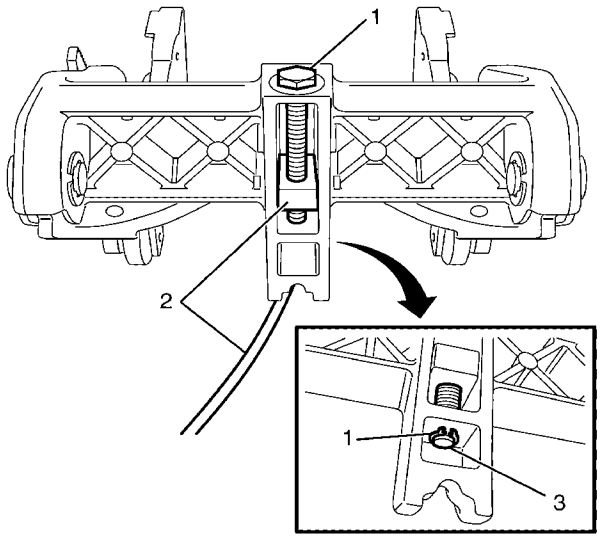
Disassembly Procedure



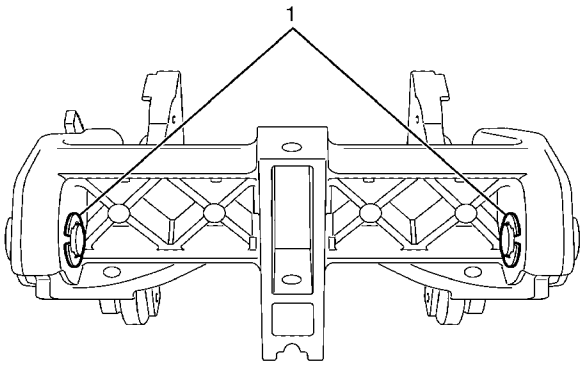
Important: The park brake lever upper grip (1) is retained by clips and glue. Lift the park brake lever upper grip (1) upwards with your fingers to detach the clips from the park brake lever lower grip (5).

Important: Due to the glue holding them together, the park brake lever upper and lower grips will need replacing once disassembled.

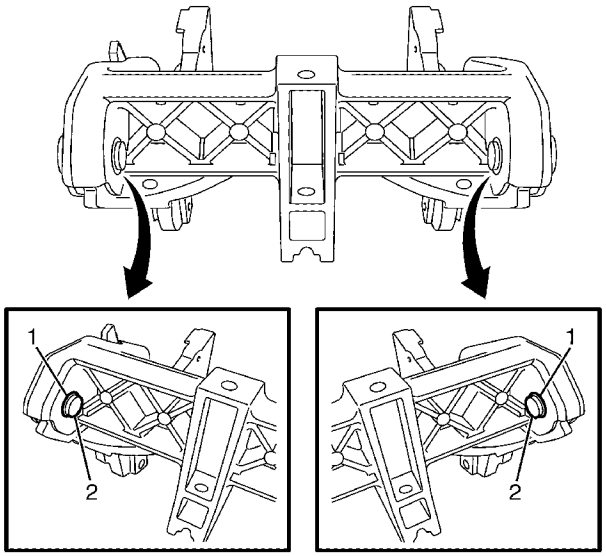
1. Remove the park brake lever upper grip (1) and discard.
2. Detach the park brake lever cable (5) from the park brake lever button (2).
3. Remove the park brake lever button (2) and the park brake lever spring.
4. Remove the park brake lever to park brake lever lower grip retaining screws (3).
5. Remove the park brake lever lower grip (4) and discard.



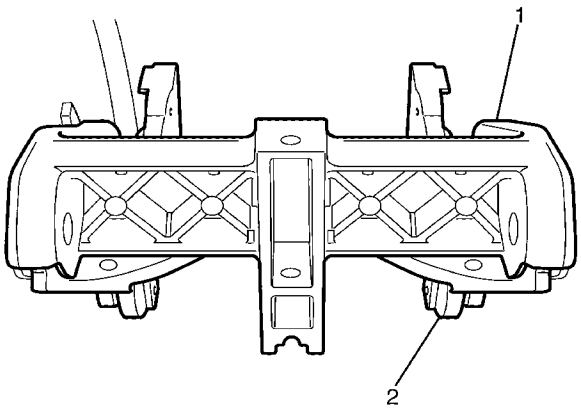
6. Remove the park brake cable adjustment bolt to park brake assembly retaining circlip (1).
7. Remove the park brake cable adjustment bolt (3).
8. Remove the front park brake cable (2).



9. Remove the pivot pin to park brake assembly retaining circlips (1).

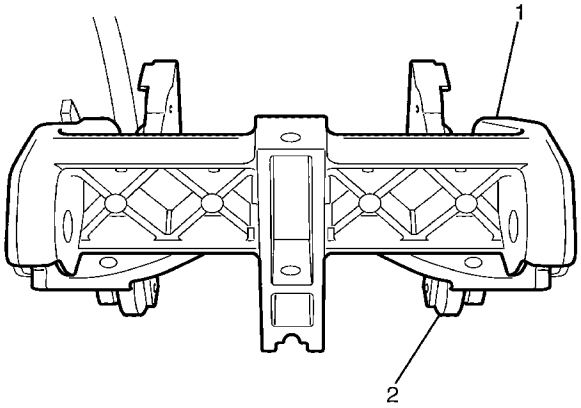


10. Remove the pivot pins (1) and bushes (2) from the park brake base.

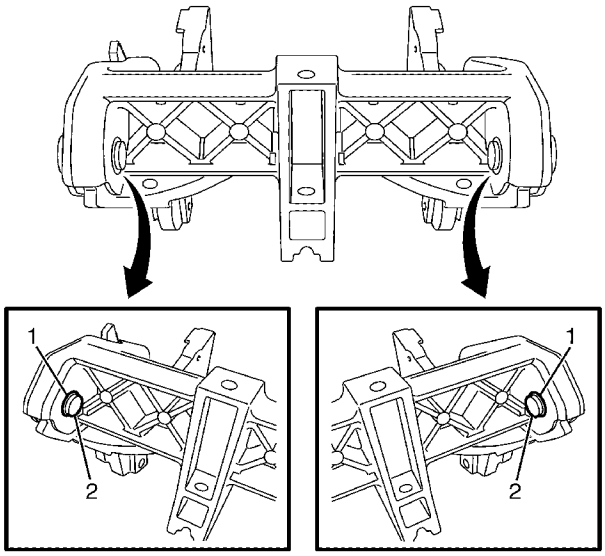


11. Separate the park brake lever assembly (1) from the park brake base (2).

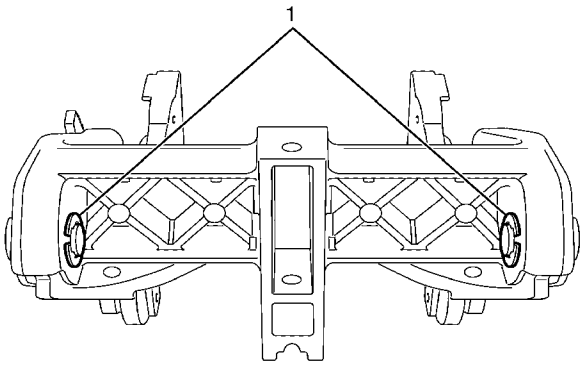
Assembly Procedure



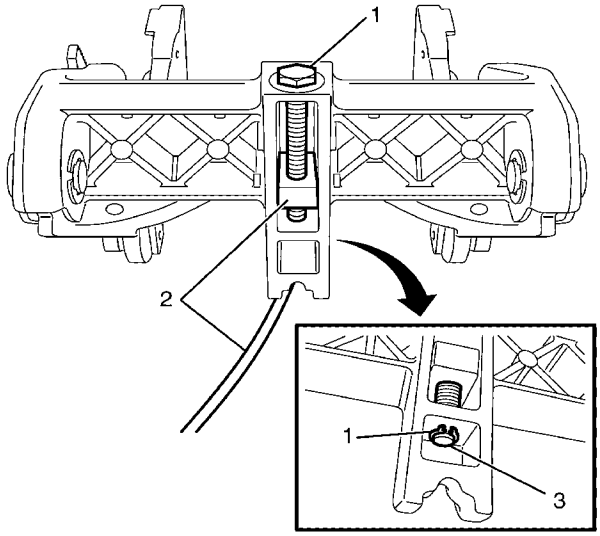
1. Install the park brake lever assembly (1) to the park brake base (2).



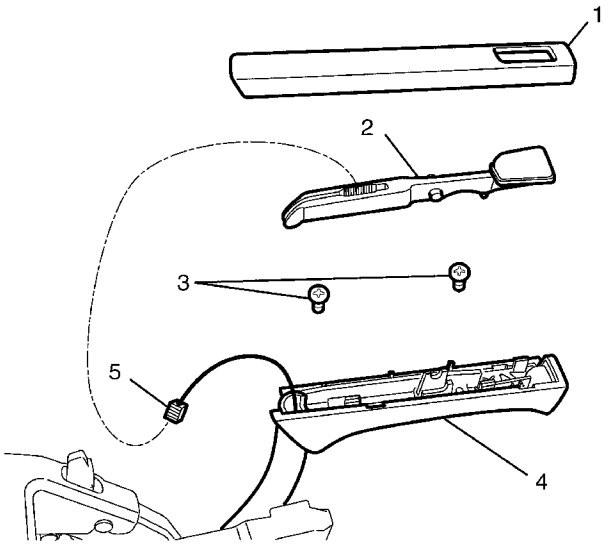
2. Install the pivot pins (1) and bushes (2) to the park brake base.



3. Install the pivot pin to park brake assembly retaining circlips (3).



4. Install the front park brake cable (2) into position.
5. Install the park brake cable adjustment bolt (3).
6. Install the park brake cable adjustment bolt to park brake assembly retaining circlip (1).



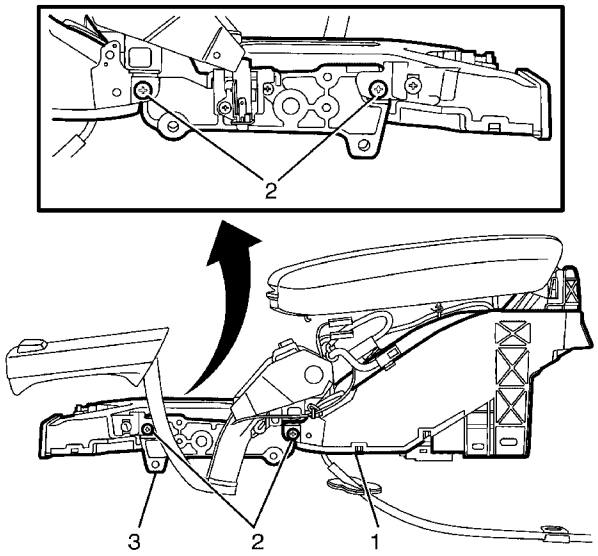
7. Install a NEW park brake lever lower grip (4).
8. Install the park brake lever to park brake lever lower grip retaining screws (3).
9. Install the park brake lever spring and the park brake lever button (2).
10. Attach the park brake lever cable (5) to the park brake lever button (2).

Important: The park brake lever upper grip (1) is retained by clips. Make sure all the clips are aligned with the park brake lever lower grip (4) and are engaged to avoid an induced rattle condition.

11. Install a NEW park brake lever upper grip (1).

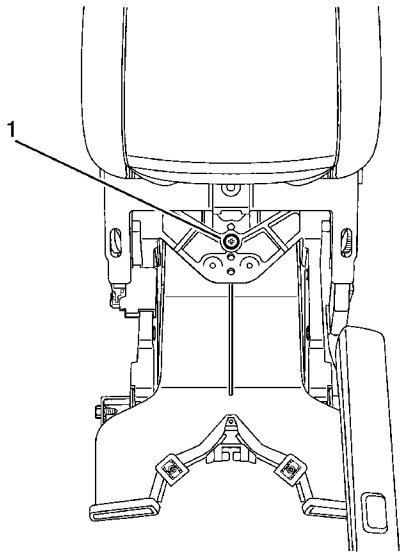
Important: This cable adjustment affects the release of the park brake, and could result in accidental release of the park brake.

Installation Procedure



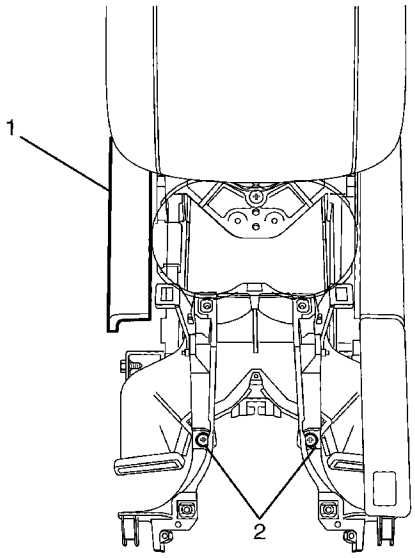
1. Install the park brake (3) to the rear floor air outlet duct (1).
2. Install the rear floor air outlet duct to park brake assembly retaining screws (2).

Tighten
Tighten the bolt to 2 Nm (18 lb in).



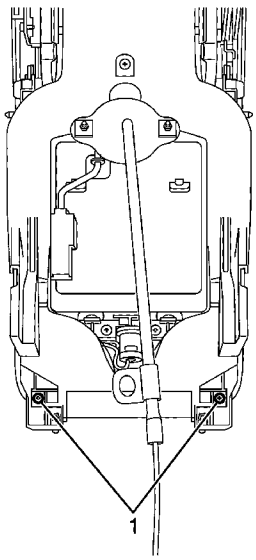
3. Install the rear floor air outlet duct to park brake assembly retaining screw (1).

Tighten
Tighten the bolt to 2 Nm (18 lb in).



4. Install the front floor console cover assembly (1).
5. Install the front floor console cover assembly to rear floor air outlet duct retaining screws (2).

Tighten
Tighten the bolt to 2 Nm (18 lb in).



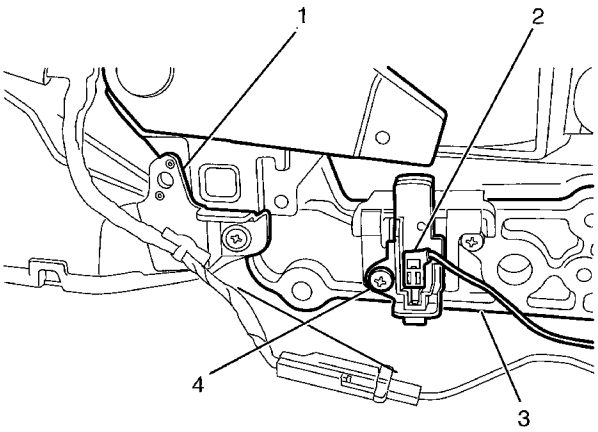
6. Install the rear front floor console cover assembly to rear floor air outlet duct retaining screws (1).

   Tighten
   Tighten the bolt to 2 Nm (18 lb in).

7. Install the front floor console assembly. Refer to Front Floor Console Replacement .
8. Adjust the park brake. Refer to Park Brake Adjustment .

Parking Brake Indicator Switch Replacement

Removal Procedure



1. Remove the front floor console left side panel. Refer to Console Trim Plate Replacement .
2. Disconnect the park brake warning lamp switch electrical connector (1).
3. Remove the park brake warning lamp switch to park brake lever assembly retaining screw (4).
4. Remove the park brake warning lamp switch (2) from the park brake lever assembly (3).

Installation Procedure

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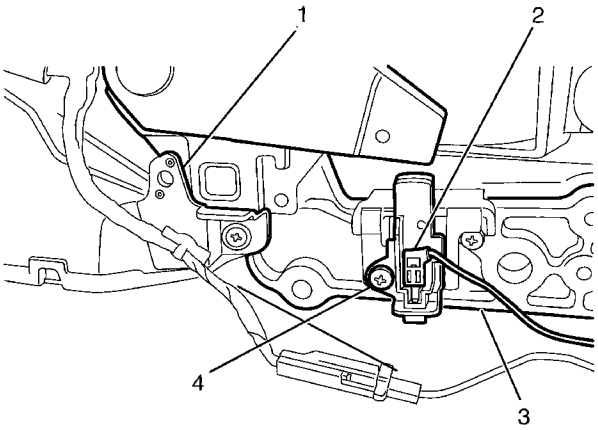


1. Connect the park brake warning lamp switch electrical connector (1).
2. Install the park brake warning lamp switch (2) to the park brake lever assembly (3).
3. Install the park brake warning lamp switch to park brake lever assembly retaining screw (4).

Tighten
Tighten the bolt to 2 Nm (18 lb in).

4. Install the front floor console left side panel. Refer to Console Trim Plate Replacement .

Parking Brake Front Cable Replacement

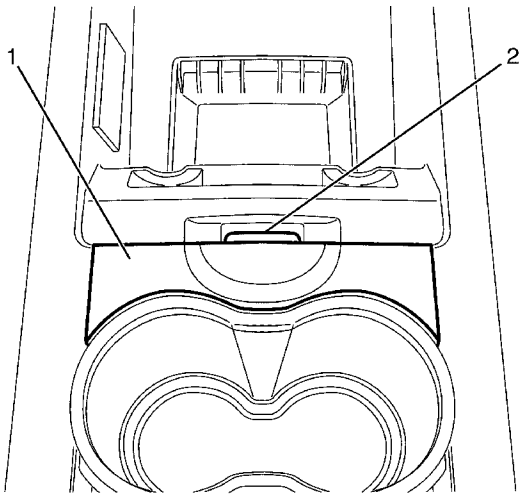
Removal Procedure

Caution: Refer to Safety Glasses Caution in the Preface section.

Caution: Refer to Vehicle Lifting Caution in the Preface section.

Caution: Refer to Brake Dust Caution in the Preface section.

1. Raise and support the vehicle. Refer to Lifting and Jacking the Vehicle .
2. Remove the rear wheels. Refer to Tire and Wheel Removal and Installation .
3. Remove the intermediate exhaust assembly. Refer to Exhaust Crossover Pipe Replacement .
4. Remove the propeller shaft heat shield. Refer to Exhaust Heat Shield Replacement - Center .
5. Remove the propeller shaft. Refer to Propeller Shaft Replacement .
6. Remove the fuel tank heat shield. Refer to Fuel Tank Heat Shield Replacement .
7. Lower the vehicle.



Important: The park brake cable adjustment bolt cover trim (1) is retained by two clips. Gently pry upwards with fingers at the front floor console armrest latch (2) to remove.

8. Remove the park brake cable adjustment bolt cover trim (1).

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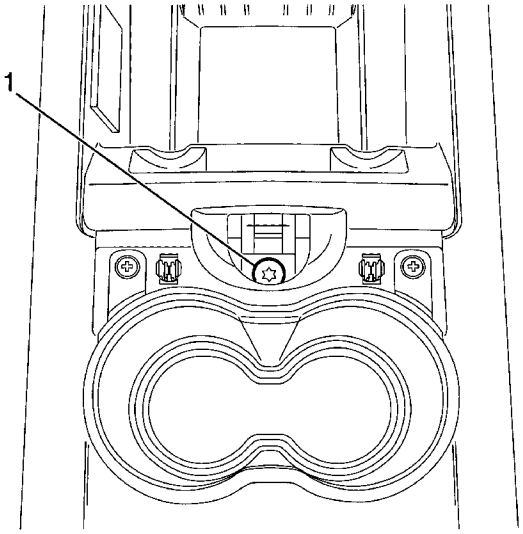
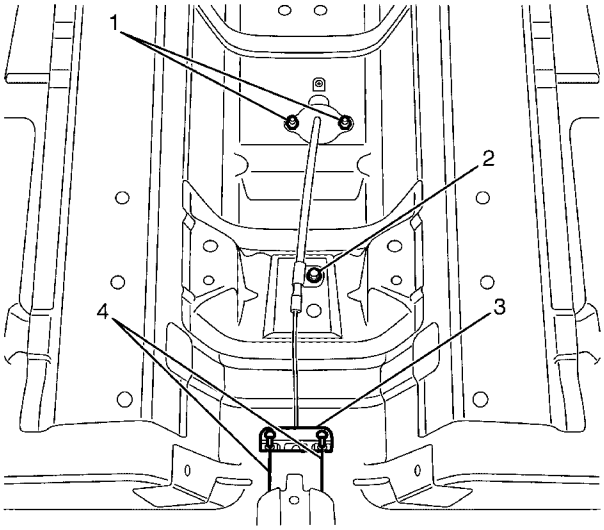


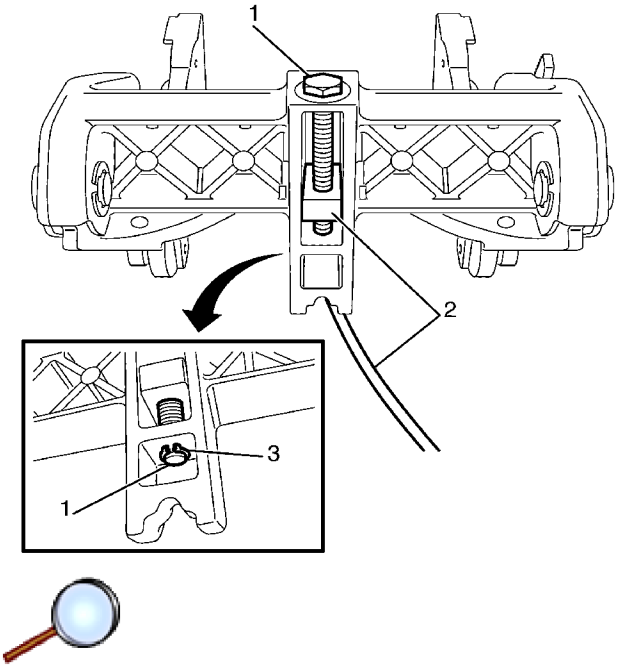
9. Loosen the park brake cable adjustment bolt (1) all the way to allow maximum slack in the rear park brake cables.
10. Raise the vehicle.



Important: Wrap a workshop cloth around the rear inner cable (4) to protect it from damage. Using pliers, pull the rear inner cable (4) forward and upwards to release the ball nipple from the front park brake cable and equaliser bracket assembly (3).

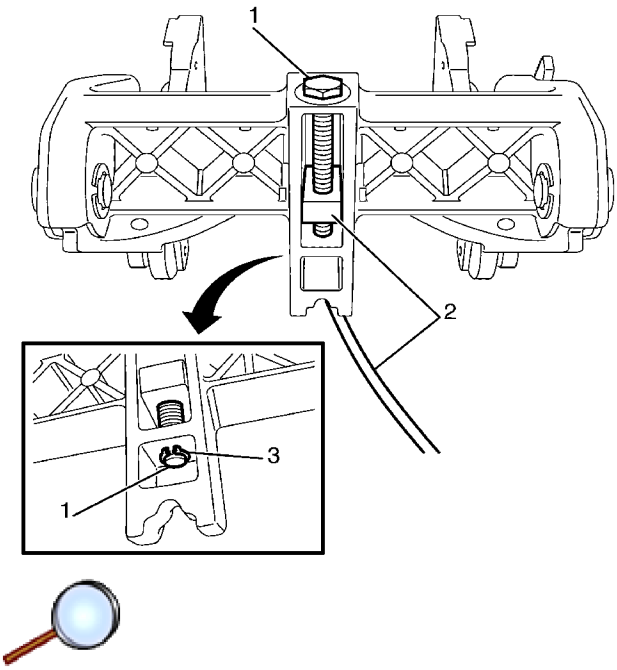
11. Remove the rear inner cables (4) from the front park brake cable and equaliser bracket assembly (3).
12. Remove the front park brake cable forward bracket to vehicle underbody retaining (1) nuts.
13. Remove the front park brake cable rear bracket to vehicle underbody retaining bolt (2).
14. Lower the vehicle.

15. Remove the park brake lever assembly from the front floor console. Refer to Parking Brake Release Handle Assembly Replacement .



16. Remove the park brake cable adjustment bolt to park brake assembly retaining circlip (3).
17. Remove the park brake cable adjustment bolt (1).
18. Remove the front park brake cable (2).

Installation Procedure

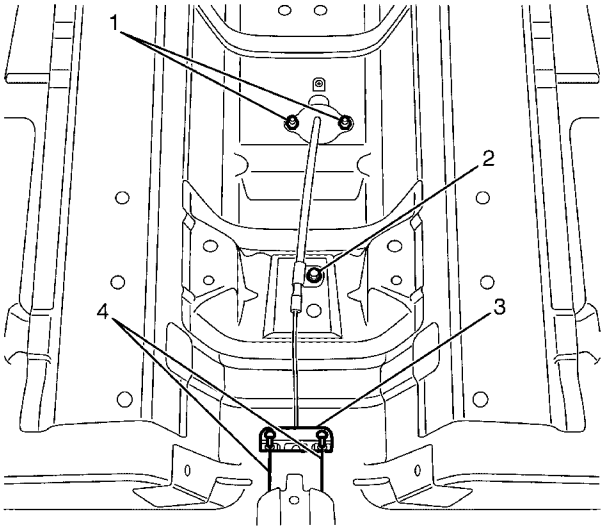


1. Install the front park brake cable (2) into position.
2. Install the park brake cable adjustment bolt (1).
3. Install the park brake cable adjustment bolt to park brake assembly retaining circlip (3).
4. Install the park brake lever assembly and front floor console. Refer to Parking Brake Release

Handle Assembly Replacement .

5. Raise the vehicle.

Notice: Refer to Fastener Notice in the Preface section.



6. Install the front park brake cable rear bracket to vehicle underbody retaining bolt (2).

Tighten
Tighten the bolt to 22 Nm (16 lb ft).

7. Install the front park brake cable forward bracket to vehicle underbody retaining (1) nuts.

Tighten
Tighten the nuts to 11 Nm (97 lb in).

Important: Wrap a workshop cloth around the rear inner cable (4) to protect it from damage. Using pliers, pull the rear inner cable (4) forward and downwards to install the ball nipple to the front park brake cable and equaliser bracket assembly (3).

8. Install the rear inner cables (4) to the front park brake cable and equaliser bracket assembly (3).

Make sure that the rear cables are properly seated.

9. Adjust the park brake. Refer to Parking Brake Release Handle Assembly Replacement .
10. Cycle the park brake pedal 2-3 times to make sure that the park brake cable retainers are seated.
11. Install the fuel tank heat shield. Refer to Fuel Tank Heat Shield Replacement .
12. Install the propeller shaft. Refer to Propeller Shaft Replacement .
13. Install the propeller shaft heat shield. Refer to Exhaust Heat Shield Replacement - Center .
14. Install the intermediate exhaust assembly. Refer to Exhaust Crossover Pipe Replacement .
15. Install the rear wheels. Refer to Tire and Wheel Removal and Installation .

16. Lower the vehicle.

Parking Brake Rear Cable Replacement

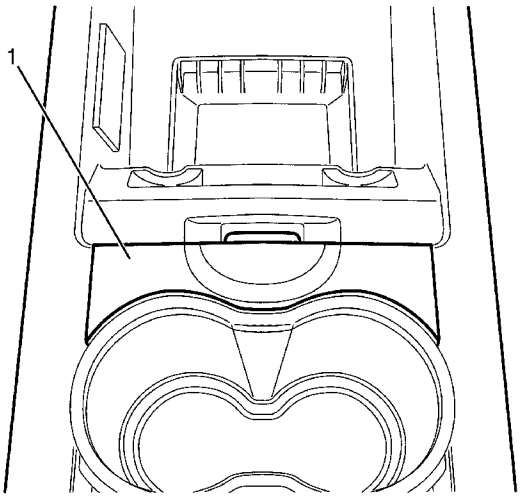
Removal Procedure

Caution: Refer to Safety Glasses Caution in the Preface section.

Caution: Refer to Vehicle Lifting Caution in the Preface section.

Caution: Refer to Brake Dust Caution in the Preface section.

1. Raise and support the vehicle. Refer to Lifting and Jacking the Vehicle.
2. Remove the rear wheels. Refer to Tire and Wheel Removal and Installation.
3. Remove the intermediate exhaust assembly. Refer to Exhaust Crossover Pipe Replacement.
4. Remove the propeller shaft heat shield. Refer to Exhaust Heat Shield Replacement - Center .
5. Remove the propeller shaft. Refer to Propeller Shaft Replacement.
6. Remove the fuel tank heat shield. Refer to Fuel Tank Heat Shield Replacement.
7. Lower the vehicle to the ground.



Important: The park brake cable adjustment bolt cover trim (1) is retained by two clips. Gently pry upwards with fingers at the front floor console armrest latch to remove.

8. Remove the park brake cable adjustment bolt cover trim (1).

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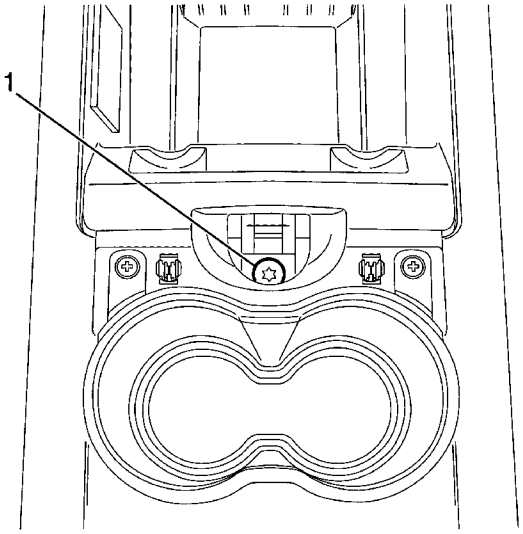
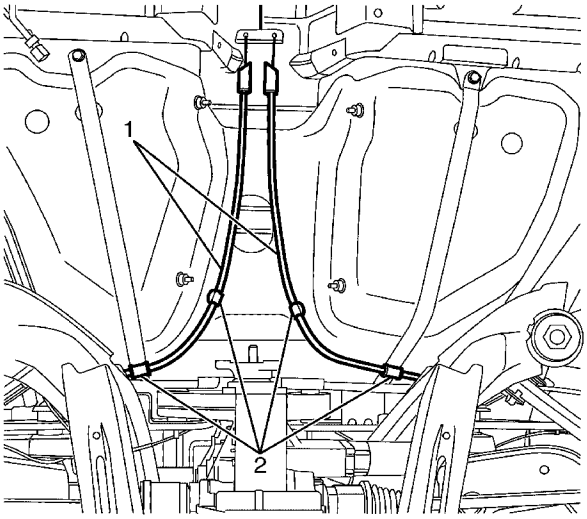
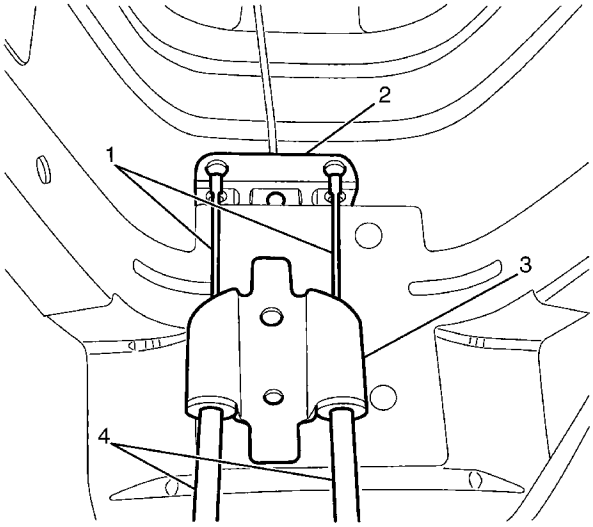


9. Loosen the park brake cable adjustment bolt (1) all the way to allow maximum slack in the rear park brake cables.
10. Raise the vehicle.



11. Detach the park brake cables (1) from the underbody park brake cable retaining clips (2).

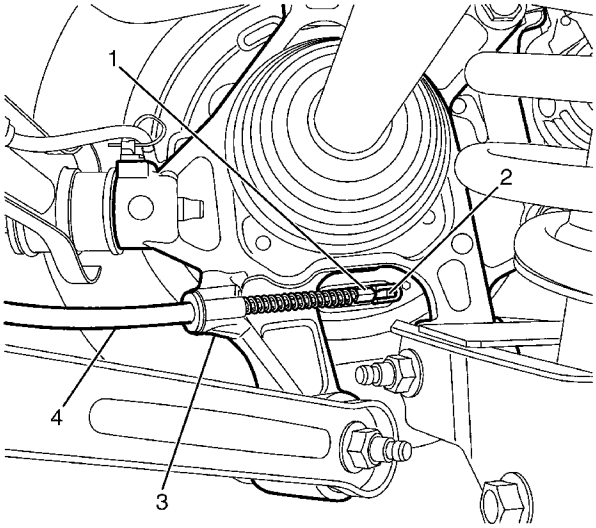


Important: Wrap a workshop cloth around the rear inner cable (1) to protect it from damage. Using pliers, pull the rear inner cable (1) forward and upwards to release the ball nipple from the front park brake cable and equaliser bracket assembly (2).

12. Remove the rear inner cables (1) from the front park brake cable and equaliser bracket assembly (2).

Important: Remove the outer cable (4) from the vehicle underbody bracket (3) by pulling the outer cable (4) rearward.

13. Remove the outer cable (4) from the vehicle underbody bracket (3).



Important: Remove the outer cable (4) from the rear knuckle (3) by pulling the outer cable (4) forward.

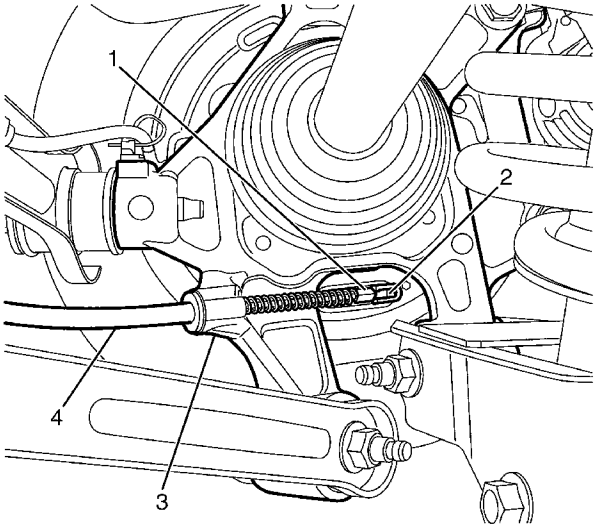
14. Remove the outer cable (4) from the rear knuckle (3).
15. Detach the rear park brake cable and clevis (1) from the park brake actuator (2).

Installation Procedure

Caution: Refer to Safety Glasses Caution in the Preface section.

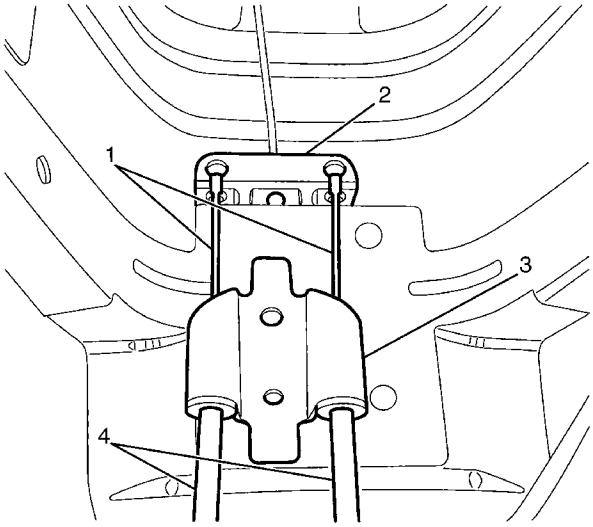
Caution: Refer to Vehicle Lifting Caution in the Preface section.

Caution: Refer to Brake Dust Caution in the Preface section.



1. Attach the rear park brake cable and clevis (1) to the park brake actuator (2).
2. Install the rear park brake cable (4) into the rear knuckle (3).

Make sure that the rear park brake cables (4) are properly seated.

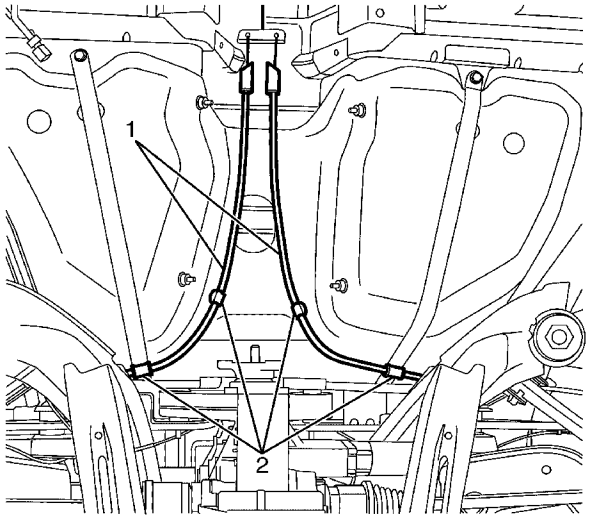


3. Install the outer cable (4) to the vehicle underbody bracket (3).

   Make sure that the outer cables (4) are properly seated in the vehicle underbody bracket (3).

   Important: Wrap a workshop cloth around the rear inner cable (1) to protect it from damage. Using pliers, pull the rear inner cable (1) forward and downwards to install the ball nipple to the front park brake cable and equaliser bracket assembly (2).

4. Install the rear inner cables (1) to the front park brake cable and equaliser bracket assembly (2).



5. Attach the park brake cables (1) to the underbody park brake cable retaining clips (2).
6. Adjust the park brake. Refer to Park Brake Adjustment.
7. Cycle the park brake lever 2-3 times to make sure that the park brake cable retainers are

seated.

8. Install the fuel tank heat shield. Refer to Fuel Tank Heat Shield Replacement.
9. Install the propeller shaft. Refer to Propeller Shaft Replacement.
10. Install the propeller shaft heat shield. Refer to Exhaust Heat Shield Replacement - Center.
11. Install the intermediate exhaust assembly. Refer to Exhaust Crossover Pipe Replacement.
12. Install the rear wheels. Refer to Tire and Wheel Removal and Installation.
13. Lower the vehicle to the ground.

Parking Brake Actuator Replacement

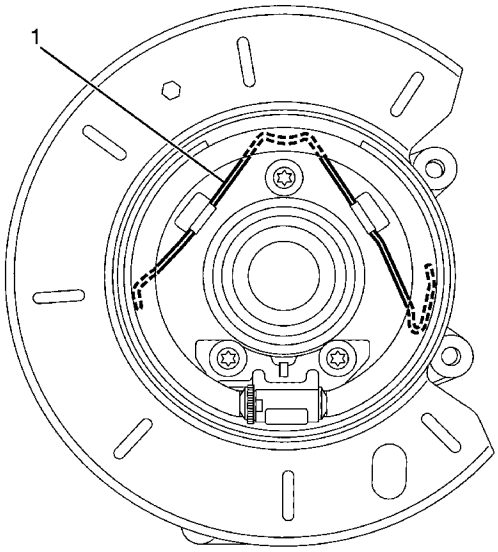
Removal Procedure

Caution: Refer to Safety Glasses Caution in the Preface section.

Caution: Refer to Vehicle Lifting Caution in the Preface section.

Caution: Refer to Brake Dust Caution in the Preface section.

1. Raise and support the vehicle. Refer to Lifting and Jacking the Vehicle .
2. Remove the rear wheels. Refer to Tire and Wheel Removal and Installation .
3. Remove the rear brake caliper and brake disc. Refer to Rear Brake Rotor Replacement .
4. Remove the rear wheel hub and bearing assembly. Refer to Rear Wheel Bearing and Hub Replacement .
5. Rotate the park brake adjusting nut until all park brake shoe adjustment has been removed.



6. Remove the park brake shoe retaining spring (1).

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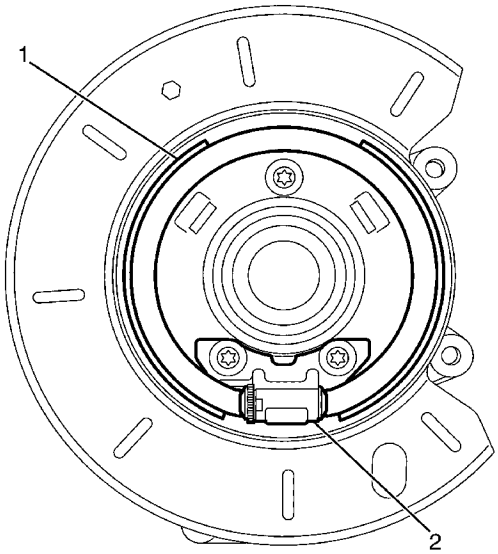
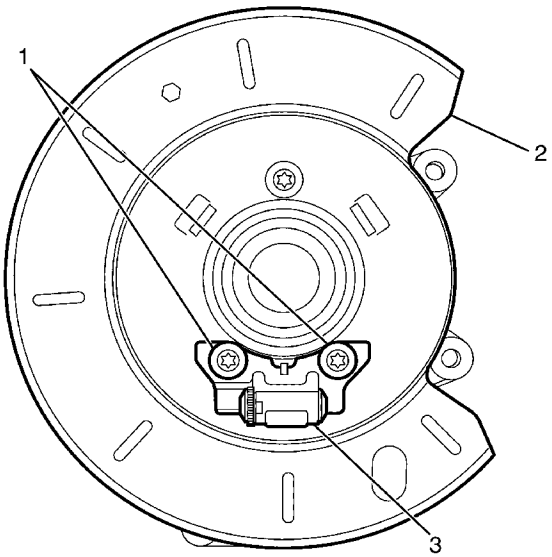


Important: Detach the park brake shoe (1) from the actuator assembly (2) by grasping the shoe and pushing upwards.

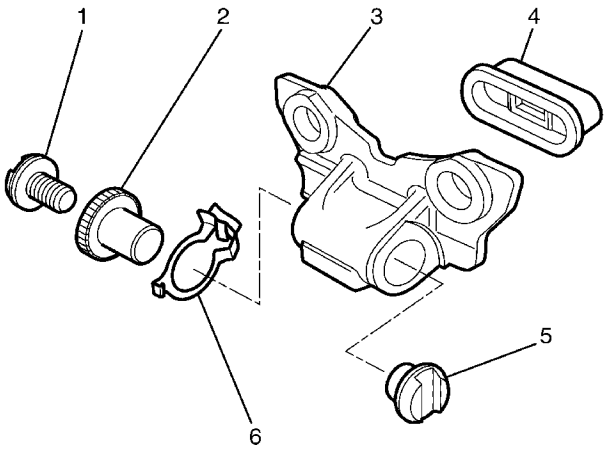
7. Detach the park brake shoe (1) from the actuator assembly (2).
8. Remove the park brake shoe (1).



9. Remove the actuator assembly / backing plate to knuckle retaining bolts (1).

Important: Slide the actuator assembly (3) downwards to detach the actuator assembly (3) from the locating tab on the backing plate (2).

10. Remove the actuator assembly (3) from the backing plate (2).



Important: Using a flat blade screwdriver remove the adjuster nut (2) from the abutment plate (3).

11. Remove the adjuster nut (2) from the abutment plate (3).
12. Remove the adjustment screw (1) from the adjuster nut (2).

Important: Using a flat blade screwdriver remove the tappet (5) from the abutment plate (3).

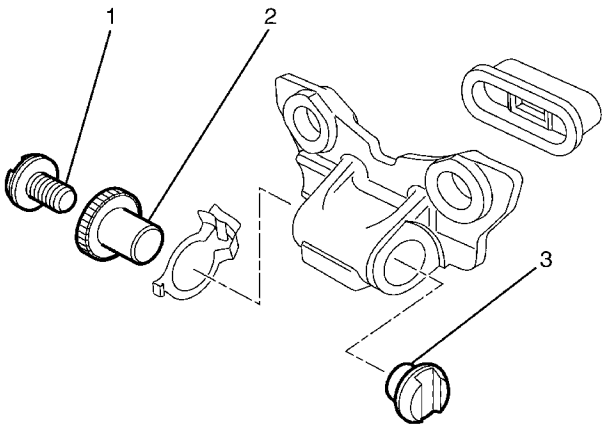
13. Remove the tappet (5) from the abutment plate (3).
14. Remove the adjustment pawl (6).
15. Remove the dust cover (4) from the abutment plate (3).

Installation Procedure

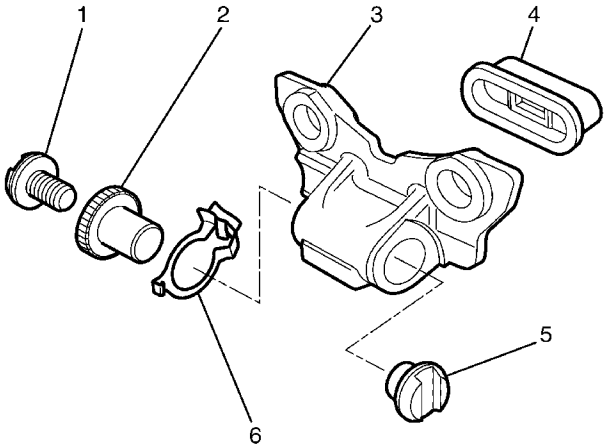
Caution: Refer to Safety Glasses Caution in the Preface section.

Caution: Refer to Vehicle Lifting Caution in the Preface section.

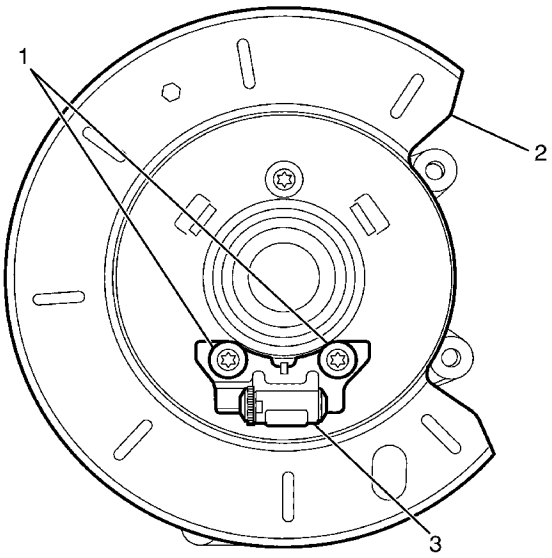
Caution: Refer to Brake Dust Caution in the Preface section.



1. Apply a small amount of GM approved silicone grease to positions (2, 3). DO NOT apply grease to the bolt threads (1).



2. Install the dust cover (4) to the abutment plate (3).
3. Install the adjustment pawl (6).
4. Install the tappet (5) to the abutment plate (3).
5. Install the adjustment screw (1) to the adjuster nut (2).
6. Install the adjuster nut (2) to the abutment plate (3).



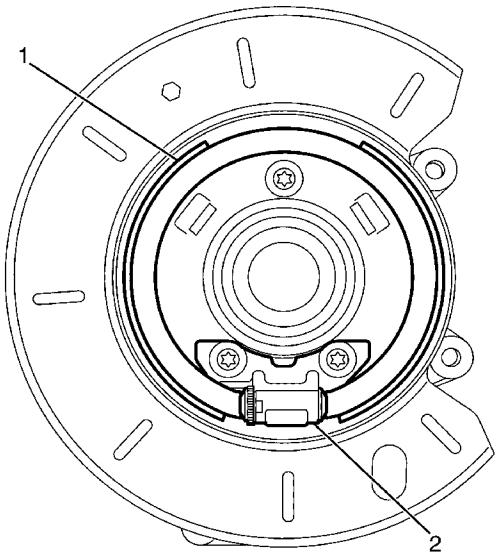
Important: Slide the actuator assembly (3) upwards to attach the actuator assembly (3) to the locating tab on the backing plate (2).

7. Install the actuator assembly (3) to the backing plate (2).

   Notice: Refer to Fastener Notice in the Preface section.

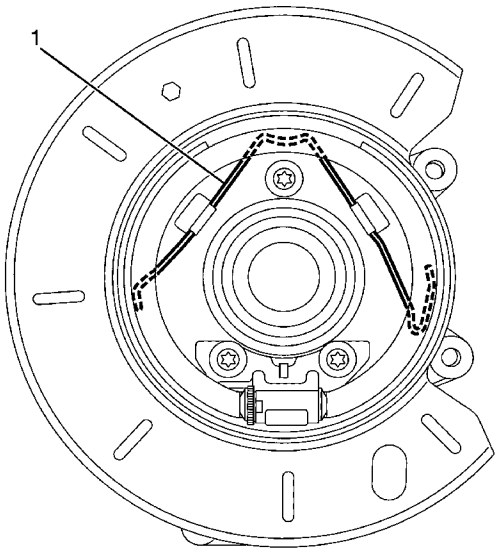
8. Install the actuator assembly/backing plate to knuckle retaining bolts (1).

   Tighten
   Tighten the bolt to 130 Nm (96 lb ft).



Important: Install the park brake shoe assembly (1) by grasping the shoe and spreading slightly while pulling the shoe over the actuator assembly (2).

9. Install the park brake shoe assembly (1) to the actuator assembly (2).



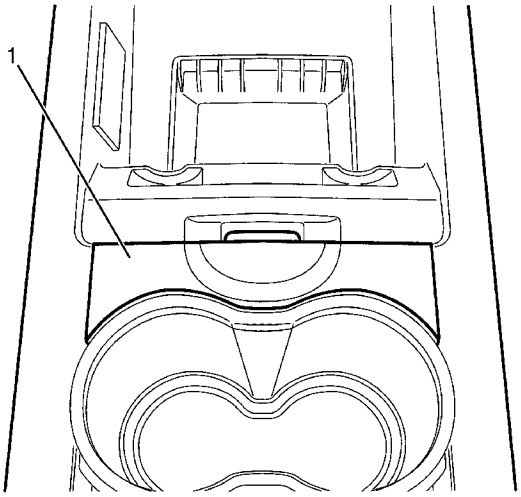
10. Install the park brake shoe retaining spring (1).
11. Install the rear wheel hub and bearing assembly. Refer to Rear Wheel Bearing and Hub Replacement .
12. Install the rear brake disc and rear brake caliper. Refer to Rear Brake Rotor Replacement .
13. Adjust the park brake. Refer to Park Brake Adjustment .
14. Install the rear wheels. Refer to Tire and Wheel Removal and Installation .
15. Lower the vehicle.

Parking Brake Adjustment

Caution: Refer to Safety Glasses Caution in the Preface section.

Caution: Refer to Vehicle Lifting Caution in the Preface section.

Caution: Refer to Brake Dust Caution in the Preface section.



Important: The park brake cable adjustment bolt cover trim (1) is retained by two clips. Gently pry upwards with fingers at the front floor console armrest latch to remove.

1. Remove the park brake cable adjustment bolt cover trim (1).

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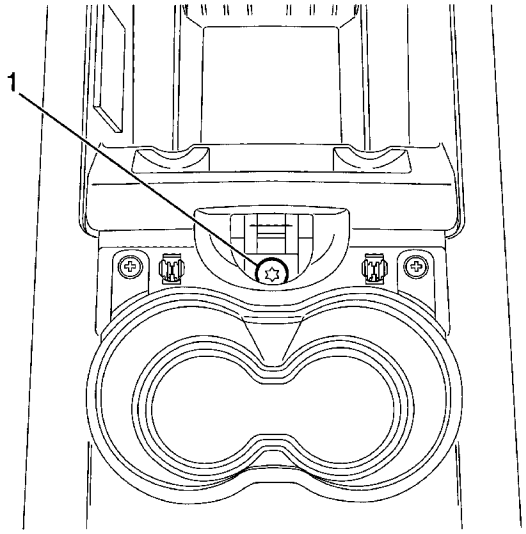
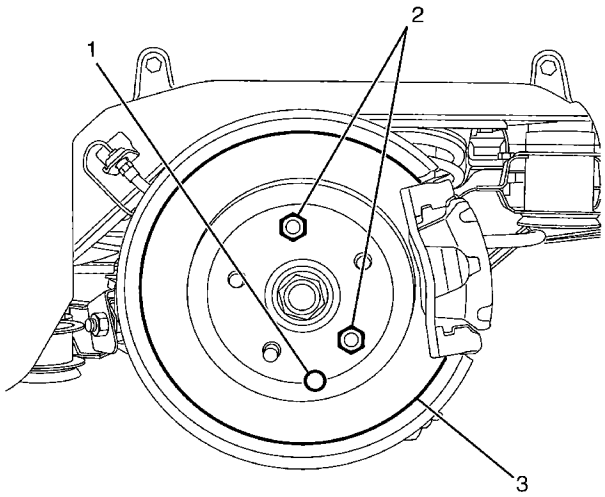
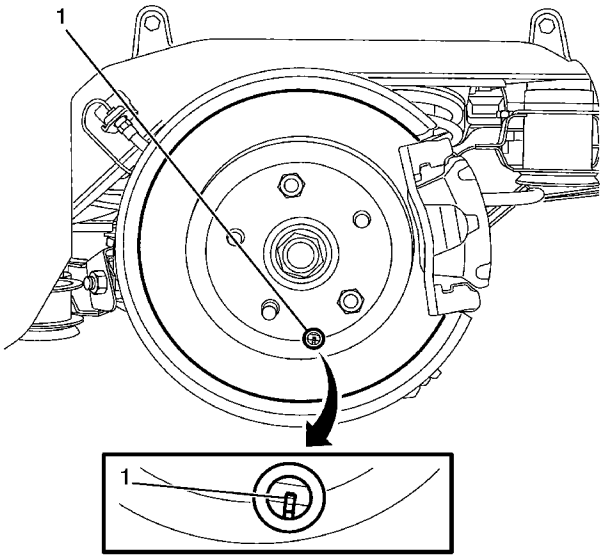


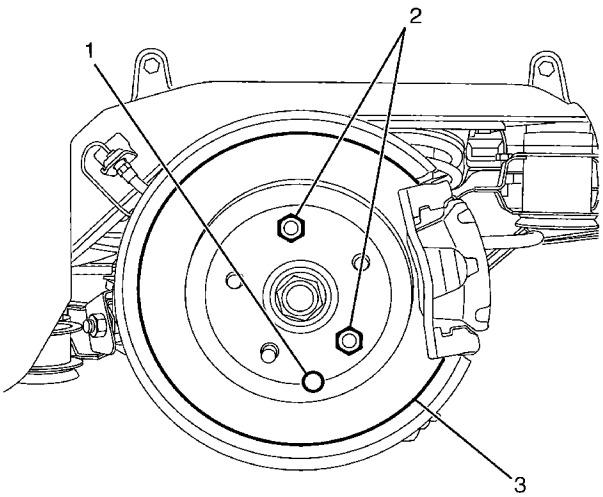
2. Loosen the park brake cable adjustment bolt (1) several turns to allow slack in the park brake rear cables.
3. Make sure that the park brake actuator arms have fully retracted.
4. Raise and support the vehicle. Refer to Lifting and Jacking the Vehicle.
5. Remove the rear wheels. Refer to Tire and Wheel Removal and Installation.



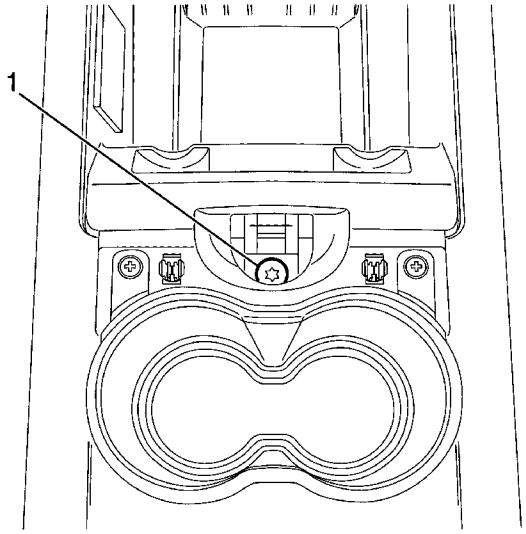
6. Install 2 wheel nuts (2) in reverse to opposite wheel studs to retain the brake disc (3) to the hub.
7. Make sure that the brake disc (3) is free and does not bind. If the brake disc (3) is binding refer to the following procedures.
   - Brake Rotor Thickness Variation Measurement.
   - Brake Rotor Assembled Lateral Runout Measurement.
   - Brake Caliper Inspection.
8. Remove the access hole plug (1) from the brake disc (3).



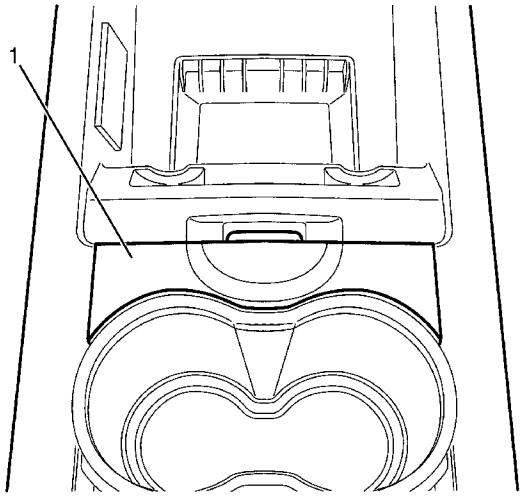
9. Using a suitable lever such as a screwdriver, tighten the adjuster nut (1), until the brake disc is locked.
10. Loosen the adjuster nut (1) 3-5 clicks. Make sure that the brake disc is free and does not bind.



11. Install the access hole plug (1).
12. Remove the 2 wheel nuts (2) retaining the brake disc (3) to the hub
13. Install the rear wheels. Refer to Tire and Wheel Removal and Installation.
14. Lower the vehicle.



15. Apply the park brake until the lever is extended 4-6 clicks.
16. Tighten the park brake cable adjustment bolt (1) to remove any excess slack from the park brake cable.
17. Make sure that this adjustment applies the park brake shoes by attempting to turn each rear wheel.
18. Release the park brake and inspect that each rear wheel is free and does not bind.
19. Lower the vehicle to the ground.



20. Install the park brake cable adjustment bolt cover trim (1).